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Philadelphia College of Osteopathic Medicine

Department of Psychology

AN EVALUATION OF A GROUP NUTRITIONAL PROGRAM IN A POPULATION  
OF OBESE INDIVIDUALS WITH PSYCHIATRIC DISABILITIES

by Jamie L. Via

Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

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**Abstract**

Individuals with serious mental illnesses are at high risk for obesity. The increased risk of obesity and comorbid medical conditions among individuals with serious mental illnesses has increased the need to seek and utilize effective treatments to address obesity in this population. In efforts to address the need for effective treatment, Eli Lilly and Company developed the Solutions for Wellness program. The aim of this study was to examine if the Solutions for Wellness nutritional program was effective in increasing wellness knowledge and increasing healthy lifestyle choices within a small sample of obese individuals with serious mental illnesses. The nutritional program was assessed using a multiple-case repeated measures design with multiple measures before, during, and after the intervention. The results show the potential for obese individuals with serious mental illnesses to be active in learning and making healthy lifestyle changes to improve their health and mental well-being. The results of this study suggest that individuals with serious mental illnesses consider interventions to address health concerns important, and they have the ability and motivation to make healthy lifestyle choices to improve overall wellness.

## Table of Contents

Acknowledgements.....	iii
Abstract.....	v
Table of Contents.....	vi
Chapter 1: Introduction.....	1
Statement of the Problem.....	1
Purpose of the Study.....	4
Chapter 2: Literature Review.....	5
Obesity.....	5
Comorbid Medical Conditions.....	6
Metabolic Syndrome.....	6
Quality of Life.....	7
Financial Costs.....	9
Mortality and Morbidity.....	10
Need for Treatment.....	11
Obesity and Serious Mental Illness.....	13
Models of Health Behavior Change.....	15
Social Cognitive Theory.....	15
Health Belief Model.....	16
Transtheoretical Model.....	17
Weight Loss Interventions in the General Population.....	19
Behavioral Interventions.....	20
Therapeutic Interventions.....	20
Weight Loss Programs.....	21
Pharmacotherapy Interventions.....	23

EVALUATION OF A GROUP NUTRITIONAL PROGRAM	vii
Surgery Interventions.....	24
Wellness Movement for Individuals with SMI.....	25
Weight Loss Interventions for Individuals with SMI.....	27
Solutions for Wellness.....	32
Hypotheses .....	33
Chapter 3: Methods.....	37
Participants.....	37
Recruitment Procedure.....	39
Screening Phase.....	39
Intervention Phase.....	39
Inclusion Criteria.....	41
Exclusion Criteria.....	41
Measures.....	42
Body Mass Index.....	42
University of Rhode Island Stages of Change.....	42
Medical Outcomes Study Short-From 12-Item Health Survey.....	43
Topic Assessment .....	44
Healthy Eating and Wellness Self- Assessment.....	45
Healthy Behavior Inventory.....	46
The Warwick-Edinburgh Mental Well-being Scale.....	46
Design and Justification.....	47
Chapter 4: Results.....	49
Figure 3.....	96
Figure 4.....	96
Chapter 5: Discussion.....	62

EVALUATION OF A GROUP NUTRITIONAL PROGRAM	viii
Limitations.....	69
Conclusion.....	71
Future Directions.....	71
Chapter 6: References.....	75
Appendix A.....	88
Appendix B.....	89
Appendix C.....	90
Appendix D.....	94



## **Chapter 1**

### **Introduction**

#### **Statement of the problem.**

Obesity is considered a chronic condition and a major cause of morbidity and mortality in the United States (Gatchel & Oordt, 2003). The rates of overweight and obese adults are estimated to be around 66% for individuals aged 20 to 74 years, according to the National Health and Nutritional Examination Survey completed in 2001 to 2002 (Sheipe, 2006). Moreover, this condition has substantially increased in both developed and underdeveloped countries. According to the World Health Organization, the estimated number of overweight and obese adults worldwide has exceeded 1 billion as of 2005 (Dalton, 2006; Golay, 2000).

Similar to the rise in obesity in the general population, the risk for becoming obese has also significantly increased for people with serious mental illnesses. Furthermore, people who have serious mental illnesses are commonly in overall poorer physical health compared to the general population. They have an increased risk of premature death, and their psychiatric illness, treatment, and lifestyle choices are considered factors that contribute to high morbidity and mortality rates (Connolly & Kelly, 2005; Dickerson et al., 2005; Harris & Barraclough, 1998; Holmberg & Kane, 1999; Phelan, Stradins, & Morrison, 2001). People with serious mental illnesses are also at higher risk for diabetes, obesity, gastrointestinal disease, respiratory disease, and cardiovascular disease (Connolly & Kelly, 2005; Harris & Barraclough, 1998; Le Fevre, 2001; Sokal et al., 2004). Although some of these diseases may be due to natural causes and/or sometimes significant side effects of medications, many are also linked to poor lifestyle choices (i.e., poor diet, lack of exercise, and smoking). While lifestyle choices

play a role for everyone vis-a-vis obesity, people with serious mental illnesses are often poor, and have less access to good physical health care options than the general population (Connolly & Kelly, 2005; Dixon et al., 2000; Goldman, 1999; Holmberg & Kane, 1999; Le Fevre, 2000; Phelan et al., 2001).

In addition to poor lifestyle choices and less access to medical treatment, people with serious mental illnesses are often engaged in long-term pharmacotherapy, and many of the medications prescribed have weight gain as a side effect. Antipsychotics, antidepressants, mood stabilizers, and even anxiolytics are associated with weight gain. However, the greatest weight gain appears to be associated with antipsychotic medications (Allison, Mackell, & McDonnell, 2003; Brown, 2006; Connolly & Kelly, 2005; Devlin, Yanovski, & Wilson, 2000; Phelan et al., 2001; Sokal et al., 2004; Vreeland, Minsky, Radler, Roemheld-Hamm, & Stern, 2003). While the newer antipsychotic medications were originally believed to have a lower side effect profile, it is now known that they are not more efficacious than the older antipsychotics (Allison et al., 1998; Allison et al., 2003; Dixon et al., 2000) and that they carry significant side effects, as well. For instance, Toalson and colleagues (2004) cite studies indicating old and newer antipsychotic medications are associated with increased risk of *metabolic syndrome* among people with serious mental illnesses. *Metabolic syndrome* is associated with medical conditions such as obesity, hypertension, elevated fasting glucose level, hyperuricemia, and dyslipidemia (Toalson, Saeeduddin, Hardy, & Kabinoff, 2004). Furthermore, the use of the newer antipsychotics has, at times, dramatically increased the rates of obesity and diabetes for individuals with serious mental illnesses, although it has

been well documented that rates of these medical comorbidities were elevated even prior to the advent of newer antipsychotics (Dixon et al., 2000; Fenton & Chavez, 2006).

Due to the various health concerns that people with serious mental illnesses face, treatment for obesity is of paramount importance. Changing antipsychotic medications could be a viable option; however, this may be riskier than attempting other wellness interventions. People with serious mental illnesses are advised to participate in frequent weight monitoring and should be considered on exercise, lifestyle choices, self-care practices, and disease management, as are individuals in the general population (Connolly & Kelly, 2005; DiFranco, Bressi, & Salzer, 2006; Shiner, Whitley, Van Citters, Pratt, & Bartels, 2008). According to DiFranco and colleagues (2006), people with serious mental illnesses reported benefiting from health promotion information, contingent upon its “trustworthiness, proximity and availability, and the specificity and depth of information communicated” (p. 255). In addition, exercise and diet interventions have appeared to assist in weight loss for people with serious mental illnesses (Bushe et al., 2006; Faulkner, Soundy, & Lloyd, 2003; Fogarty, Happell, & Pinikahana, 2004; Shiner et al., 2008). Addressing and lowering the mortality risk of individuals with serious mental illnesses is long overdue. Health promotion and health intervention efforts are warranted and desired by mental health consumers. The addition of promoting healthy lifestyle choices encourages professionals to meet the health needs of consumers and fits with current wellness and recovery paradigms. Moreover, these efforts will likely empower consumers by providing the information and tools needed to successfully manage their physical health.

**Purpose of the study.**

This study was designed to examine the effectiveness of a wellness program used in a population of individuals with severe mental illnesses. *Solutions for Wellness, Choosing Wellness: Healthy Eating* has been developed by Lilly as an intervention to promote nutrition, wellness, and healthy lifestyle choices in individuals with severe mental illness. The program being is one part of a two-part series in the *Solutions for Wellness* protocol; the other component includes a physical exercise component. The *Solutions for Wellness, Choosing Wellness: Healthy Eating* portion was designed by Betty Vreeland, Anna Marie Toto, and Marie Sakowitz to assist individuals with severe mental illnesses in a group setting and includes pretest and posttest options for each topic area. The program was evaluated utilizing a multiple-case repeat measures design, outcome indicators based on assessment data collected throughout the intervention and assessment data collected before and after the intervention. This study is aligned with PCOM's Clinical Psy. D. program goals to produce practitioners with a broad and general knowledge base that informs the profession of psychology, as well as add to an evolving body of scientific knowledge to the profession of psychology. The results of this study are intended to add to the growing knowledge base of addressing clients' overall wellness. This study addressed the growing obesity problem and health concerns among individuals with serious mental illnesses in order for professionals to better address these concerns.

## Chapter 2

### Review of the Literature

Obesity and the treatment of obesity are of great concern within the population of individuals with serious mental illnesses. In order to fully understand the scope of the obesity issue for individuals with serious mental illnesses, information will be reviewed regarding the definition of obesity, the negative factors associated with living with obesity, and treatment options for the general population as well as individuals with serious mental illnesses. To further support the need to address obesity and the treatment of this condition, this section will review and discuss theories of behavior change, primarily associated with adopting healthy behaviors, and the wellness movement associated with treating individuals in a holistic manner, including health and nutrition components in treatment processes.

#### **Obesity.**

*Criteria for obesity.* Currently, the diagnosis of obesity is determined by a standard measure called the body mass index (BMI), which is a ratio of weight to height. Obesity is defined as having a BMI of 30 or above, and morbid obesity is a BMI greater than 40. This measurement is commonly used and accepted by the World Health Organization and the U.S. Government. Therefore, the BMI is frequently used to determine if an individual's weight is in the healthy range. Following the BMI criteria for obesity, approximately one third to over half of the U.S. population has been determined to be overweight or obese

(Flegal, Carroll, Kucsmarski, Johnson, 1998; Sagrillo & Kunz, 2004).

***Comorbid medical conditions.*** Obesity is associated with 5 of the 10 leading causes of death in the United States: heart disease, cancer, stroke, diabetes, and atherosclerosis. Obesity is also a risk factor for various chronic medical illnesses (i.e., heart disease, diabetes, cancer, and hypertension) (Connolly & Kelly, 2005; Gatchel & Oordt, 2003; Sagrillo & Kunz, 2004; Sheipe, 2006; Vogel, 2006). Dickerson and colleagues (2005) reported that a higher BMI is associated with hypertension, diabetes, a desire to weigh less, and overall reduced health-related functioning (p. 306).

***Metabolic syndrome.*** Obesity has been linked to a condition called *metabolic syndrome* or *syndrome X*. Metabolic syndrome is associated with a multitude of ailments, such as hypercholesterolemia and glucose intolerance. People with this syndrome are at increased risk for developing diabetes and cardiovascular disease (Ford, Giles, & Dietz, 2002). The National Cholesterol Education Program (2001), Adult Treatment Panel III (ATP III), reports that individuals meet the criteria for metabolic syndrome when having three or more of the following: abdominal obesity (men = greater than 40 inches; women = greater than 35 inches), high triglyceride levels, low high-density lipoprotein levels, high blood pressure, and high fasting glucose levels. The pear shape and apple shape descriptions of obese individuals have been associated with metabolic syndrome, too. The apple shape is associated with a larger amount of body fat in the abdominal area, and this body type is associated with greater risk for metabolic syndrome (Dalton, 2006).

*Quality of life.* Quality of life (QOL) has several definitions. There are two primary theoretical perspectives, a global multidimensional view of QOL and health-related QOL. The global view of QOL encompasses a more holistic perspective, which includes aspects of cultural and societal concepts that health-related QOL may overlook. Health-related QOL is primarily focused on physical and mental health aspects of QOL. According to an article by Register and Herman (2006), a more global view of QOL is beneficial and helpful when looking towards a multifaceted explanation of quality of life, in order to avoid a deficit-oriented approach, or a more narrow, medical view of QOL. Their article includes the following six forces and processes when describing one global definition of QOL: metaphysically connected (i.e. self-esteem, purpose, optimism), spiritually connected (i.e. prayer, meaning, fellowship), biologically connected (i.e. physical comfort, functional capacity), connected to others (i.e. social support, cultural dynamics), environmentally connected (i.e. socioeconomic status, safety, transportation), and connected to society (i.e., personal social system and global societal systems) (Register & Herman, 2006).

When considering the above conceptualization of QOL, it should be no surprise that obesity is considered a factor that alters an individual's QOL. Obesity impacts quality of life negatively and could lead to mental health problems (i.e. lowered self-esteem and depressive symptomatology) (Connolly & Kelly, 2005; Gatchel & Oordt, 2003; Strine et al., 2008, Vogel, 2006). In a study conducted by Kruger and colleagues (2007), obese individuals in comparison to overweight or normal weight individuals reported poorer health-related QOL in four areas: "self reported health, number of

physically unhealthy days, number of mentally unhealthy days, and number of activity limitation days” (Kruger, Bowles, Jones, Ainsworth, & Kohl, 2007, p. 323). This article suggests that, due to inactivity, obese individuals have increased concerns in social and psychological areas, as well as increased physical problems (Kruger et al., 2007). Similarly, Kawachi (1999) reported that weight gain impacts physical health, reduces quality of life, and has been associated with poorer overall mental health. The consequences of weight gain “can become an added burden for patients with schizophrenia and other mental disorders” (Kawachi, 1999, p. 5). Overall, obesity appears to be associated with poorer health-related quality of life constructs, such as mental health and physical health issues.

Additionally, obese individuals may experience stigma related to negative societal attitudes. Stigma or others’ attitudes may negatively impact obese individuals’ quality of life. For example, when an individual’s level of support decreases or isolation increases, the prevalence of other concerns may increase in the following areas: “poorer general health, dissatisfaction with life, disability days, physical distress, mental distress, activity limitations, depressive symptoms, anxiety symptoms, insufficient sleep, and pain” (Strine, Chapman, Balluz, & Mokdad, 2008, p. 151). “Moreover, the prevalence of smoking, obesity, physical inactivity, and heavy drinking” are factors associated with decreased emotional and social support (Strine et al., 2008, p. 151). Conversely, social and emotional support have been associated with reduced risk for mental illness, physical illness, and mortality (Strine et al., 2008). Therefore, the attitudes of others and support from others may positively or negatively impact struggles with obesity.



In consideration of the negative societal view of obese individuals, individuals with serious mental illnesses can be further impacted. “Outrageous stereotypes of persons with serious mental illness remain widespread. But the negative stereotyping is only one type of stigma . . . .” (Gill, 2008, p. 183). Despite efforts to decrease negative views of individuals with serious mental illnesses, stigma continues to be an issue. Not only are these negative views inaccurate, it is estimated that approximately 76 million Americans live in fear that others may find out about their mental illness, due to concerns about stigma and negative attitudes (Dingfelder, 2009). Furthermore, Dingfelder (2009) cited a study that showed evidence that some individuals with serious mental illnesses may feel some of these negative stereotypes are true, such as the view that people with serious mental illnesses are less trustworthy. Individuals with serious mental illnesses who believed in this stereotype were found to isolate more, which leads to less social support (Dingfelder, 2009). With valid concerns of social rejection related to mental health problems, the impact of being obese and seriously mentally ill can be doubly stigmatizing. Overall, obesity poses serious risks for overall psychosocial well-being, and maintaining psychosocial well-being is a life-long journey. Obesity is a life-long issue because it leads to greater concerns regarding physical health, activity ability, and emotional health; it also leads to financial concerns due to increased health care costs.

***Financial costs.*** Obesity has a significant financial impact for individuals as well as society in general. In the late 1990s, high health care costs and low work productivity cost the United States an average of \$100 billion per year (Wolf & Colditz, 1998), while in 2000, U.S. health care expenditures totaled more than \$11 billion for individuals

classified as morbidly obese. The excess costs of obesity include in office-based visits, outpatient hospital care, inpatient care, and prescription drug costs (Arterburn, Maciejewski, & Tsevat, 2005). According to Wolf and Colditz (1996), the cost of obesity and obesity-related illnesses totals over \$45 billion annually. Dalton (2006) estimated even higher overall costs of obesity in the United States, an estimated \$117 billion in the year 2000 alone. The costs related to obesity will continue to remain high or rise without efforts to address this serious health care concern. The lack of reimbursement for preventative and intervention options for weight management is another barrier to addressing obesity and avoiding long-term quality-of-life and financial costs associated with obesity. Overall, the high prevalence of obesity and comorbid conditions has significant implications for U.S. health care costs. Despite discrepancies in estimated costs, the economic burden of obesity in U.S. adults appears to be significant and substantial and adds further evidence of the need for effective treatment interventions.

***Mortality and morbidity.*** Obesity is a serious public health concern, as obesity is correlated with increased risk of mortality and morbidity (Devlin, et al., 2000). Mortality is linked to obesity because mortality appears to be a greater risk in obese individuals with a BMI of 30 or greater. Due to evidence of a correlation between increased waist size and mortality, the National Institutes of Health have used waist circumference as a standard to assess risk for mortality (Dalton, 2006). Fontaine et al. (2003) found that obesity appears to also be associated with a shortened life expectancy. Their study showed that obesity was related to an increase in the “expected number of years of life

lost” (Fontaine, Redden, Wang, Westfall, & Allison, 2003, p. 187). For example, in men, this could mean a 22% expected loss of years. Overall, this study found that obesity tends to decrease years of life expectancy significantly in young adults versus older adults (Fontaine et al., 2003). In the United States, it is estimated that about 400,000 deaths annually are due to obesity-related causes (Korenkov, Sauerland, & Junginger, 2005). Therefore, the higher the BMI, the greater the risk for mortality (Troiano, Frongillo, Sobal, & Levitsky, 1996).

Although mortality is the most severe consequence of obesity, morbidity and conditions associated with obesity can have an impact throughout a lifetime. According to Sturm and Wells (2001), obesity predicts a physical health-related quality of life similar to poverty. This study further reported that obesity is associated with morbidity similar to poverty, smoking, and problem drinking (Sturm & Wells, 2001). The seriousness of obesity remains consistent as people age, too. Researchers found that a higher body mass index in middle age is associated with a decreased quality of life later in life (Daviglius et al., 2003). “With more people surviving to older ages, it is becoming increasingly important to address not only morbidity but also the disability and poor quality of life that can accompany aging even in the absence of clinical disease” (Daviglius et al., 2003, p. 2452). Overall, morbidity and mortality associated with obesity continues to be the biggest risk or cost associated with this condition.

***Need for treatment.*** Treatment for obesity has been prioritized in this country due to its high prevalence, as obesity ranks in prevalence with smoking, hepatitis C, and HIV/AIDS (Dalton, 2006; Korenkov et al., 2005). Most members of the medical

community support the concept that obesity is reaching a crisis level. In 2001, the U.S. Surgeon General emphasized the need to address obesity, as obesity “could wipe out some of the gains we’ve made in areas such as heart disease, several forms of cancer, and other chronic health problems” (Fontaine et al., 2003; *Surgeon General’s Call to Action to Prevent and Decrease Overweight and Obesity*, 2001).

As early as the 1990s, evidence-based treatment for weight loss gained recognition in the professional realm. According to a national report in 1998, accepted methods of weight loss and weight maintenance included diet therapy, physical therapy, behavior therapy, pharmacotherapy, and surgery (Dalton, 2006). The more typical approach to weight loss includes diet modification, exercise, and sometimes medication, which may lead to a 5% to 10% loss in body weight. However, recidivism with weight loss exceeds 90% within 5 years (Korenkov et al., 2005; Solomon & Dluhy, 2004). Therefore, the need for effective long-term treatment of obesity is a significant concern. Despite these concerns and the effects of yo-yo dieting, as little as a 5% loss in body weight could alleviate many of the medical complications associated with obesity, as well as, reduce the high mortality and morbidity rates associated with obesity. Additionally, weight loss has been associated with decreasing or ceasing frailty in obese older adults, thereby, decreasing the concerns with age-related physical disability (Dalton, 2006; Villareal, Banks, Sinacore, Siener, & Klein, 2006). Furthermore, overweight adults with type 2 diabetes experience significant improvement in health-related quality of life factors when participating in a weight loss program (Williamson et al., 2009).

**Obesity and serious mental illness.**

Similar to the general population, individuals with serious mental illnesses (SMI) are negatively impacted by obesity. Harris and Barraclough (1998) reported an increase in the prevalence of comorbid medical conditions and premature deaths among people with SMI; however, the association between elevated BMI and medical conditions has only recently been investigated in the SMI population. This population is especially at risk of experiencing weight gain secondary to medications (e.g., antipsychotics). In addition to the weight gain associated with medications, individuals with SMI and obesity frequently experience a decrease in quality of life. Even when gender and body mass index are controlled for, weight gain is associated with poorer quality of life, general health, and vitality in individuals with SMI (Allison et al., 2003). Therefore, some negative correlates of obesity may affect individuals with SMI differently than the general population. Additionally, there appears to be much less research to understand the high rates of obesity in individuals with SMI than individuals without SMI. Obesity and weight gain are of a significant concern in the SMI population, as obesity is associated with further negative impacts on physical and mental functioning.

In order to understand the difference between the general population and individuals with SMI, it is important understand the definition of serious mental illness (SMI). According to the Substance Abuse and Mental Health Services' Administration (SAMSHA) Office of Applied Studies, the definition of serious mental illness requires the person to have at least one 12-month disorder, other than a substance use disorder, that met the *Diagnostic and Statistical Manual of Mental Disorders* (4<sup>th</sup> ed., text rev.,

*DSM-IV-TR*; American Psychiatric Association, 2000) and to have serious impairment.

A SAMHSA advisory group suggested that the term serious impairment be defined as impairment equivalent to a Global Assessment of Functioning (GAF) score of less than 60 (Endicott, Spitzer, Fleiss, & Cohen, 1976; Epstein, Barker, Vorburger, & Murtha, 2002).

The above is a federally accepted definition of serious mental illness; there still appears to be some variation of this definition from state to state. Historically, the definition of mental illness included all disorders from the *Diagnostic and Statistical Manual of Mental Disorders*. However, according to Peck and Scheffler (2002), the definition of mental illness has been reformulated due to closings of institutions and loss of funding for community programming. Still, SMI is primarily defined by a diagnosis following *DSM-IV-TR* and International Classification of Diseases criteria, functional disability, and the duration of the illness. The criteria for diagnosis, duration, and disability appear to fluctuate among states. Therefore, organizations like the National Alliance for the Mentally Ill (NAMI) and the National Mental Health Association (NMHA) have advocated for more consistency in the definition of SMI for mental health parity.

Currently, NAMI notes the following to be considered priority populations with serious mental illness: “schizophrenia, schizoaffective disorder, major depressive disorder, bipolar disorder, obsessive-compulsive disorder, panic disorder and other severe anxiety disorders, and attention-deficit hyperactivity disorder” (Peck & Scheffler, 2002, p. 1091). With the variation in approved definitions, prevalence rates of SMI across

states vary from 3% to 23% (Narrow et al., 1998). Therefore, for the purpose of this study, the federal definition and the NAMI list will be used.

### **Models of health behavior change.**

To understand what leads to changes in health behavior, a variety of health behavior change models have been developed. The following is not an extensive overview of all the models; this review will focus on three of the most widely used: social learning theory/social cognitive theory, the health belief model, and the transtheoretical model of change (Oldenburg, Ffrench, and Glanz, 1999).

***Social cognitive theory.*** This theory of health behavior change stems from Albert Bandura's social cognitive conceptual framework. Social cognitive theory explains human behavior as a dynamic action that is influenced by many factors, such as modeling, personal factors, and environmental influences. In addition, this theory attempts to explain behavior change through cognitions, behaviors, and emotions. Bandura believed that individuals not only are affected by the environment (e.g., observations and imitations) but also utilize cognitive processes and life experiences when performing an action (Hergenhahn & Olson, 2005). Some key concepts in this theory include reciprocal determinism, observational learning and reinforcement, and self-efficacy. In consideration of health behaviors, self-efficacy is a key component in health behavior change. *Self-efficacy* is confidence in one's ability to take action and persist in this action (Bandura, 1986). Overall, social cognitive theory has been utilized in health promotion programs in community and health care settings, via use of key

concepts such as observational learning, goal setting, and behavioral contracting (Oldenburg et al., 1999).

***Health belief model.*** The health belief model (HBM) is a popular theory in the context of health education and health promotion. This theory was initiated in the 1950s, when there was a need for public health programs to encourage medical screenings for diseases like polio and tuberculosis (Finfgeld, Wongvatunyu, Conn, Grando, & Russell, 2003; Glanz, Lewis, & Rimer, 2002). Currently, this theory has been applied to understand existing health problems and develop therapeutic interventions for health problems. The HBM is based on the major concept that health behavior is determined by perceptions about the disease and methods to decrease it. An individual's way of knowing and behaving is based on beliefs and emotions, as well as decision making that may change over time. According to the HBM, behavior is influenced primarily four perceptions about the health condition in question: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Other factors that may influence health behavior are modifying variables (i.e., motivation, experience, and skill), cues to action (i.e., people, things, and events), and self-efficacy (Glanz et al., 2002). When utilizing this theory, health professionals' goal is to develop a "disposition to act to attain or maintain a positive state of health" (Finfgeld et al., 2003, p. 290). Health professionals encourage health behavior change through techniques to address the four perceptions. Some methods to overcome erroneous or negative perceptions would be to encourage problem solving to remove perceived barriers or target specific perceptions to motivate individuals toward health change behavior. The HBM provides useful



theoretical information to conceptualize an individual's perceptions, as well as options to promote health behavior.

***Transtheoretical model.*** The transtheoretical model (TTM) is a popular health change behavior stage theory, that was developed in the 1980s by James Prochaska at the University of Rhode Island (Oldenburg et al., 1999, Singer, 2007). This stage theory was originally developed as a method to conceptualize change in addictive behavior; however, the TTM has been helpful in addressing health behaviors such as diet, exercise, and smoking (Bock, Marcus, Rossi, & Redding, 1998; Singer, 2007). Also, the TTM has been utilized with motivational interviewing techniques to promote outpatient treatment adherence in individuals with serious mental illness and in individuals with dual diagnoses (Swanson, Pantaloni, & Cohen, 1999). The TTM has been used to address a variety of treatment issues, which typically include treating difficult problem behaviors and improving outcomes of treatment. Overall, this model combines social cognitive concepts with stages of change to explain variations in behavioral intent (Garber, Allsworth, Marcus, Hesser, & Lapane, 2008).

The TTM proposes five primary stages of change: precontemplation, contemplation, preparation, action, and maintenance. Although the stages can be achieved in a linear manner, at any point, an individual may relapse into a previous stage (Singer, 2007). Each stage differs in behavioral intent or level of participation in changing a behavior. In the precontemplation stage, an individual is likely to not even consider the benefits of a healthy behavior change. While in the contemplation stage, s/he is more likely to be actively considering healthy behavior change and has begun to

evaluate the costs and benefits of change. As s/he progresses to readiness to change and starting to set goals to change, one would be considered to be in the preparation stage. Furthermore, s/he is considered to be in the preparation stage because change is likely to occur within 1 month (Wee, Davis, & Phillips, 2004). Precontemplation, contemplation, and preparation are all considered inactive phases, since actual behavior change has yet to take place (Lippke, Ziegelmann, Schwarzer, & Velicer, 2009). Active phases of change start with the action stage, when an individual begins to actively engage in attempts to change behavior and methods to change are being implemented. At this stage, relapse is likely to occur, and this stage is considered to be achieved in approximately 6 months (Oldenburg et al., 1999). Around 6 months, an individual is considered to be in the maintenance stage. At this stage, the behavior is considered maintained and a long-term change.

Various research studies have investigated how motivation to change impacts behavior in treatment settings. Field et al. (2009) cited mixed results regarding stage of change and treatment adherence for individuals with substance-related disorders. The authors noted in their review studies reporting no association between stage of change and treatment adherence, as well as studies reporting a greater likelihood of treatment adherence and completion of treatment for individuals in higher stages of change (i.e., contemplation or action phases) (Field, Adinoff, Harris, Ball, & Carroll, 2009). Although studies investigating the association between stage of change and behavior change are mixed, it seems more likely that an individual volunteering for treatment to address a problem would be in a higher stage of change. This is in contrast to an individual who

does not believe there is a problem; hence, this individual would be in a lower stage of change and less likely to volunteer for treatment. With regard to losing weight, improving diet, and increasing exercise, the stage of change would likely impact whether the individual volunteers for treatment and whether s/he makes healthy behavior changes. The majority of individuals participating in weight loss, dieting, and exercise behaviors are in the advanced stages of change (Wee et al., 2004). In addition, individuals in the preparation, action, and maintenance stages are likely to be more receptive to learning skills and methods to commit to long-term healthy behavior changes. In consideration of health promotion efforts and treatment professionals, understanding the stages of change has been helpful in order to tailor health interventions to an individual's readiness to change (Oldenburg et al., 1999). Furthermore, there is evidence that TTM has been useful in developing health interventions in a population of individuals with serious mental illnesses in an attempt to decrease the health problems associated with antipsychotic-induced weight gain (Archie et al., 2007).

**Weight loss interventions in the general population.**

Currently, weight loss programs are largely comprised of encouraging and promoting nutritional and physical activity components. Still, many acknowledge the need for more effective interventions for obesity, as obesity is the leading cause of preventable death and correlates with other life threatening conditions (Dickerson, et al., 2006; Fontaine, Redden, Wang, Westfall, & Allison 2003). Some critics have discouraged weight loss programs stating that dieting is harmful and ineffective, as yo-yo

dieting can increase the risk of disease and long term weight gain (Devlin et al., 2000; Gatchel & Oordt, 2003).

***Behavioral interventions.*** The treatment of choice for moderately obese individuals (BMI > 30) includes changing eating habits, lifestyle change, and increased exercise (Devlin et al., 2000). Some guidelines for weight loss may include restricting eating to specific times and places, removing high-fat foods from the home, avoiding restaurants, using social support, developing coping skills, exercising, increasing or maintaining motivation, and following a low-fat diet (Gatchel & Oordt, 2003). The U.S. government have outlined the following methods to decrease obesity: “improve the accessibility to nutrition information for all segments of the population, focus on preventive methods in children, strengthen the link between nutrition and physical activity in health promotion efforts, maintain a strong national program for nutrition research, and work closely with the public and private sectors on the local, state, and national levels to sustain the aforementioned strategies” (Gatchel & Oordt, 2003, p. 152).

***Therapeutic interventions.*** Although psychotherapy is not considered a primary choice for treatment of obesity, some research has shown therapy to be useful. Behavior therapy is considered a treatment for mild to moderate obesity (Krinick, 2000; Marcus et al., 2000). Cognitive behavioral therapy (CBT) and interpersonal therapy have been found to be effective at lowering stress and improving eating patterns in a population of obese individuals with binge eating disorder (Devlin et al., 2000).

A study by Sbrocco and colleagues (1999) compared a behavioral treatment to a cognitive behavioral treatment for weight loss and found that all participants increased

participation in physical activity; however, the cognitive behavioral group maintained this healthy behavior longer. In regard to eating behavior, both treatment group participants showed a decrease in BMI, leading some participants to transition from an obese to an overweight category. Although, this may be considered a slow rate of change, the health implications remain positive for the participants (Sbrocco, Nedegaard, Stone, Lewis, 1999). The limitations of this study were the reliance on self-report for data, low generalizability (small sample size consisting of moderately obese women), and the duration of the study (less than 20 weeks). Overall, both groups appeared to benefit from weight loss and experienced increased self-esteem (Sbrocco et al., 1999).

Like other weight loss treatments, the concern remains with the long-term maintenance of weight loss; poor maintenance of weight loss will decrease the long-term benefits of therapeutic treatments to effectively manage obesity. Still, therapeutic interventions show positive evidence for the ability to decrease obesity in the general population and individuals with serious mental illnesses when participants are actively engaged in treatment (Ames, 2005; McClellan, Gardenswartz, & Seligman, 1999; Sbrocco et al., 1999; Umbricht, Flury, & Bridler, 2001).

***Weight loss programs.*** In addition to therapeutic and behavior-oriented approaches to weight loss, many people look to commercial weight loss programs, such as Weight Watchers or LA Weight Loss, to name a few. There is limited information for physicians and consumers of these programs to guide selection of what program will work best for an individual or if these programs are efficacious. Tsai and Wadden (2005) completed a systematic review of nonmedical weight loss programs, medically

supervised proprietary programs, Internet-based commercial weight loss programs, and organized self-help programs. Nonmedical weight loss programs, like Weight Watchers, provide a restricted diet, behavioral counseling, and recommendations for physical activity. Upon comparing limited research on nonmedical weight loss programs, Weight Watchers appeared to have the most effect, showing that members lost about 5% of initial weight over 3 to 6 months. Even this amount of weight loss can show improvements in health problems associated with obesity. In regard to medically supervised proprietary programs, which include very low calorie diets and high protein, most participants lost greater than or equal to 3 pounds per week for the first few months. However, this loss came with risks of gallstones, cold intolerance, hair loss, and constipation. OPTIFAST and Medifast are common programs that would be considered medically supervised proprietary programs. Despite some of the negative side effects, studies showed participants lost 15.3% of their initial weight and maintained most of this loss over a 1-year follow-up. Unlike the above-mentioned weight loss programs, there is little evidence to support Internet-based commercial weight loss programs, such as Caloriecount.com and Myfitnesspal.com. Although participants who used online counseling and received regular feedback benefited somewhat, the overall results of Internet-based programs are limited and seem to lack substantial benefits to consumers. Lastly, organized self-help programs, such as Take Off Pounds Sensibly or Overeaters Anonymous, resulted weight loss. A minority of participants were shown to lose about 5% of their initial weight. But again, there is limited research to show if these types of programs are beneficial for

weight loss. Overall, Weight Watchers appears to be the only program to have evidence to support its claim for weight loss benefits to consumers (Tsai & Wadden, 2005).

In addition to group programs designed to support participants' weight loss, there are various popular diet plans such as Atkins, Zone, and Ornish. These diets focus on low carbohydrate intake and less on calorie restriction to aid in individuals' weight loss goals. In a study with overweight premenopausal women, the Atkins diet had shown greater weight loss results and positive results that continued at the 1-year follow-up in comparison to similar low carbohydrate diet plans and the more traditional LEARN diet plan, which is based on current nutritional guidelines (Gardner et al., 2007). Overall, there are a variety of programs to offer guidance for individuals interested in losing weight. The evidence to support certain diet plans and programs continues to show mixed results, although some appear to be more beneficial for initial and long-term maintenance of weight loss than others. Diet plans and programs offer some options for those attempting to lose weight. When behavioral interventions, diet plans, or weight loss programs lack results, some individuals may turn to pharmacotherapy interventions in hopes of meeting their weight loss goals.

***Pharmacotherapy interventions.*** According to Gatchel and Oordt (2003), most pharmacotherapy options for weight loss have been deemed effective when combined with changes in diet and exercise; however, the long term loss of weight using pharmacotherapy has been questionable. Historically, medication that suppresses appetite has been utilized, such "fen-phen," or dl-fenfluramine and phentermine, until it was deemed unsafe for users. Other options have been serotonin reuptake inhibitors,

such as bupropion SR (Wellbutrin XR or Zyban); even medications like Prozac and Ritalin have been tried for weight loss purposes. Again, many of these medications have not been considered highly effective and often were not approved as a weight loss intervention (Gatchel & Oordt, 2003). Recently, the U.S. Food and Drug Administration (FDA) approved an over-the-counter weight loss product, orlistat (Alli), in combination with a behavioral modification plan (i.e. diet and exercise plan) as a weight loss intervention. Initial research has shown orlistat, in conjunction with the behavioral modification plan, to be an effective weight loss option (Schwartz, Bansal, Hale, Rossi, & Engle, 2008). Overall, many of the medication options encourage the combination with lifestyle changes, such as improved diet and exercise. Individuals with serious weight management concerns or individuals who do not benefit from the above-mentioned interventions may seek surgical interventions for weight management purposes.

***Surgery interventions.*** Research has shown that bariatric surgery (also known as gastric bypass) is one of the best and longest lasting treatments for weight loss success, and patients who have undergone this surgery have had an overall 61% reduction in weight (Dalton, 2006; Sheipe, 2006). However, that this surgery is considered a final attempt at weight loss, and this procedure is reserved for individuals who are considered severely obese. In addition, the complexity of gastric bypass surgery has led to lower risk weight loss surgery options, such as laparoscopic adjustable gastric banding (LAGB or the lap-band). The average weight loss with banding may be slower than with the gastric bypass option; however, over time, individuals who undergo laparoscopic adjustable gastric banding have similar weight loss results (Ahroni, Montgomery, &



Watkins, 2005). Also, following either of these weight loss surgery options, a patient still has to participate in maintaining healthy eating habits and physical activity. Therefore, even when individuals opt to have weight loss surgery, they must still modify their behaviors to adapt to the results of surgery (Sheipe, 2006).

### **Wellness movement for individuals with SMI.**

Over the past decade or more, there has been a shift in the conceptualization and attitudes of understanding and treating individuals with serious mental illnesses (Coursey, Alford, & Safarjan, 1997). In the 1970s, the ex-patients' survivor movement began, followed by consumer voices, which later led to the 1990s decade of recovery movement (Ralph & Corrigan, 2005). The term *recovery* indicated a new standard in both mental and physical health care provision. As such, this paradigm focused on both mental and physical wellness among individuals with serious mental illness. Recovery describes an enduring and personalized process that is more focused on individuals' overall wellness and abilities, compared to medical or disease models of mental illness. With the recovery movement, individuals with serious mental illnesses are in a process of healing, changing, and improving health and functioning. The construct of *wellness*, involving an individual's ability to achieve and maintain health on a variety of dimensions, has become the desired goal when treating individuals with serious mental illness. The construct of wellness addresses the individual as a whole by focusing on treating multiple dimensions of life, including physical, emotional, environmental, social, and psychological dimensions (Fetter & Koch, 2009; Myers, Sweeney, & Witmer, 2000). This shift in attitude has led to a more holistic approach in the mental health field,

encouraging overall health and wellness. The concept of *holistic health* is not new, as it stems from early Greek and Jewish beliefs of treating the “whole person, thereby conceptualizing an interrelated, interdependent relationship between mind and body” (Fetter & Koch, 2003, p. 5). Although the concept of wellness has become increasingly popular in mental health, the idea of holistic wellness has been addressed in mental health, historically, by psychological theorists such as Adler, Jung, Maslow, and Rogers (Fetter & Koch, 2003). Still, the current movement encourages more personal responsibility, empowerment, and focus on overall wellness for individuals with serious mental illnesses, as well as a greater emphasis on collaboration in care and increased use of peer or natural supports to achieve changes based on individual’s personalized strength-based objectives to continue on the path of recovery (Fetter & Koch, 2003).

As noted above, this shift towards a wellness model has altered the way clinicians conceptualize and treat individuals with serious mental illnesses. According to Coursey et al. (1997), this transformation alters conceptualization and treatment in three areas: a change from pathology perspective to competence perspective, new ways to understand biology and the human experience, and changes in thinking about the causality of serious mental illness. Furthermore, this transformation has gained strength over the years due to changes in the community mental health system, such as deinstitutionalization and the Community Mental Health Centers Act of 1963. Currently, the wellness model continues to grow with the attitudes and values strongly promoted by psychosocial rehabilitation providers and the consumer movement. Furthermore, some clinical psychologists and

mental health advocates have been active in encouraging this shift in thinking, such as Salzer, Corrigan, Deegan, and Anthony to name a few (Corrigan et al., 2003; Coursey et al., 1997; DiFranco, Bressi, & Salzer, 2006; Pratt, Gill, Barrett, & Roberts, 2007).

Currently, the consumer movement or recovery movement, along with psychosocial rehabilitation providers and some state mental health departments, notably those in Connecticut and New York, (Ralph & Corrigan, 2005; Steele & Berman, 2001) have developed and encouraged the *recovery model* to follow up on the decade of recovery movement and to promote wellness for individuals with serious mental illnesses. The recovery model “refers both to the subjective experiences of hope, healing, empowerment and interpersonal support experienced by people with mental illness, their careers and service providers, and to the creation of recovery-oriented services that engender a positive culture of healing and a support for human rights” (Warner, 2009, p. 1). According to Luecht and Lasser (2006), the concept of obtaining wellness and achieving recovery are akin in that they both encompass an improvement in mental health symptoms, improvement in cognitive and social functioning, and achieving an overall better quality of life. Overall, the transformation in attitudes and values regarding serious mental illness has provided encouragement for mental health professionals to address all areas of wellness, including addressing the need to manage serious physical health conditions like obesity.

### **Weight loss interventions for individuals with SMI.**

Weight loss interventions for obese individuals with serious mental illnesses have not been systematically studied in the U.S.; however, a small number of studies suggest

that weight loss interventions such as diets, behavioral programs, and even surgery have been successful for some obese individuals with serious mental illnesses (Devlin et al., 2000). For example, Vreeland et al. (2003) studied a weight control program for patients taking antipsychotic medication. This 12-week weight control program utilized behavioral, nutritional, and exercise interventions. The data suggested that the treatment group benefited from the program due to a decrease in BMI, compared with a control group that had an increase in BMI during the 12-week period. Also, the treatment group showed “significant improvements in hunger rating, nutrition knowledge, and both days and minutes of exercise per week” (Vreeland et al., 2003). Some limitations of this study were a small sample size, no random assignment to group conditions, and the potential for weight gain occurring as an effect of other medications.

Skrinar et al. (2005) researched a fitness intervention with individuals with serious mental illnesses in randomized treatment and control groups. This study examined the effects of health education and an exercise program in limiting weight gain, improving fitness, and improving psychological indices. Although this study had a small sample size, the study showed significant positive changes in empowerment and perceived health status. Also, positive effects occurred, with a decrease in depressive symptoms and an increase in quality of life (Skrinar, Huxley, Hutchinson, Menninger, & Glew, 2005). This study is significant in that identified potential health benefits and psychological benefits of maintaining a healthy lifestyle for individuals with SMI.

Although there has not been a systematic study of weight loss interventions in this population, Loh et al. (2006) completed a comprehensive review of studies examining

potential behavioral interventions for weight management in individuals with schizophrenia. The conclusion of this review suggests that “behavioral interventions for obesity in patients with schizophrenia may be helpful in both preventative and treatment efforts” (Loh, Meyer, & Leckband, 2006, p. 29). This study reported that behavioral interventions may be helpful for prevention of weight gain in individuals with schizophrenia; however, there remain concerns with high attrition rates, feasibility of implementing behavioral interventions across a variety of settings, and the long-term benefits of behavioral interventions in this population.

Although there has been limited research on weight loss interventions for individuals with serious mental illnesses in the U.S.; the Solutions for Wellness Personalized Program has been assessed as a possible effective method for weight loss with individuals with serious mental illnesses. According to Hoffmann et al. (2005), participants were recruited through their providers (e.g., psychiatrists or primary care physicians) and enrolled in a 6-month voluntary program. Readiness for change and self-esteem were assessed, as were other health-related lifestyle factors like eating and exercise habits. According to the results of this study, individuals with serious mental illnesses benefited from the program in that they were able to make healthy lifestyle changes, that led to weight loss and increased self-confidence (Hoffman et al., 2005). Furthermore, success in the program appeared to be positively associated with readiness to change, as motivation appeared to play a significant role in participants’ ability to make the healthy changes. Although this study provided the effectiveness of support for the Solutions for Wellness protocol, it did have limitations in that the sample was not

randomized, the study had low generalizability, and participant bias and interpretation may have affected results, because data was primarily self-reported. Furthermore, this study had a high attrition rate, as 58% of the participants did not complete the program (Hoffmann et al., 2005).

Due to the ongoing concerns in the SMI population with obesity and comorbid illnesses, other countries have begun doing research using Solutions for Wellness behavioral protocols with inpatient and outpatient populations. For instance, Ireland has been utilizing this protocol in outpatients with serious mental illnesses since 2002. More recently, Bushe et al. (2008) used a Solutions for Wellness protocol in multiple centers across the country to examine whether inpatients with serious mental illnesses in acute phases could benefit from a nutritional behavioral program. The protocol included the following eight modules: health living, physical activity, the Food Pyramid, recommended food servings, fat and salt in your diet, healthy and unhealthy eating habits, high fiber diet, and controlling your hunger. These modules were discussed over a 4-week period in 30-minute sessions. The researchers found positive results, as only 30% of the subjects gained weight after a 24-day follow-up, while the remainder maintained or lost weight. Although this study had positive outcomes and included research reviews suggesting benefits from similar programs, the sample sizes were small and the interventions were primarily short in duration (Bushe, McNamara, Haley, McCrossan, & Devitt, 2008).

Similar to the above-mentioned study in Ireland, a Solutions for Wellness protocol was utilized for 3 months in a Scandinavian study assessing subjective well-being and

weight among individuals with serious mental illnesses. This study utilized data collected from 49 psychiatric clinics, the program consisted of 12 lessons focused on nutrition and eating habits, as well as physical activity. The outcome of this study suggested that as a result of program participation, individuals maintained or decreased weight; however, individuals' subjective well-being did not appear to improve. Still, this study showed some evidence that this program can be utilized for a diverse population, and it can be beneficial in managing weight in individuals with serious mental illnesses (Porsdal et al., 2010).

Although the Solutions for Wellness protocol varies across countries and studies, some evidence exists that even variations of this protocol can be beneficial to inpatient and outpatient populations of individuals with serious mental illness. Vreeland et al. (2010) completed a study on *Solutions for Wellness* as utilized in and developed for U.S. individuals. This study focused on outcome measures associated with changes in knowledge and BMI among a population with serious mental illnesses in a partial hospitalization setting. The researchers used the third edition of the protocol, which was redesigned to use with adults with serious mental illnesses, as well as to address many of the modifiable lifestyle factors that contribute to excess morbidity and mortality. Various modifiable lifestyle factors, such as decreasing tobacco use and increasing stress management skills, were included to expand upon the general topic areas of nutrition and physical activity (Vreeland et al., 2010). The results showed that participants in the Solutions for Wellness group improved their knowledge of and attitudes toward making healthy choices. Also, participants had statistically significant improvements in BMI,

weight, blood pressure, and waist circumference (Vreeland et al., 2010). This study shows that Solutions for Wellness can be beneficial in increasing knowledge of health concerns and choices and in bringing about change in behaviors to promote healthy choices in a SMI population.

**Solutions for wellness.**

The Solutions for Wellness program was developed in 2007 by licensed dietitians and psychosocial rehabilitation practitioners through Eli Lilly and Company. There have been three versions of Solutions for Wellness, and the most recent is being utilized to not only address nutritional and exercise changes, but to provide additional information on lifestyle factors that can negatively impact health, such as smoking and stress. In addition, Solutions for Wellness materials can be obtained for free by contacting Lilly via their website or by telephone. The overall goal of the program is to educate participants about nutrition and wellness and to promote participation in a healthy lifestyle among people with serious mental illnesses. Lilly has made the material accessible and free of charge to be used by agencies, groups, or individuals. The program can be utilized in a group format with an instructor. The Solutions for Wellness program includes a protocol for participants, a protocol for the instructor, activity worksheets, and topic assessments (intended for use before and after sessions). The Solutions for Wellness, Choosing Wellness: Healthy Eating workbook is one of two Solutions for Wellness workbooks; the second workbook of Choosing Wellness: Physical Activity has more emphasis on the physical activity component of wellness. The Healthy Eating workbook emphasizes primary nutritional guidelines in 22 sections. See appendix A for an overview of session



topics.

### **Hypotheses/Research Questions**

#### **Overall question.**

This research project was developed to examine the following question: Is the Solutions for Wellness Choosing Wellness: Healthy Eating program effective in increasing wellness knowledge and increasing participation in healthy lifestyle choices (improving the health) of a population of obese individuals with serious mental illness?

For the purpose of this study, a multiple-case repeated measures design was utilized with five participants. The participants were assessed for 4 weeks to obtain a baseline, assessed weekly during the intervention, and then assessed for 4 additional weeks for follow-up outcomes.

***Hypothesis 1.*** Participants would exhibit an increase in knowledge of healthy lifestyle guidelines, as measured by a greater number of correct responses on Solutions for Wellness Topic Assessments.

***Rationale.*** Individuals who complete the Solutions for Wellness program would be more likely to exhibit an increase in knowledge of healthy lifestyle guidelines, as the specific guidelines addressed in the program are assessed through topic assessments before and after all 22 sessions. Participants had the opportunity to discuss and complete activities to promote the learning of healthy lifestyle guidelines throughout the intervention. This hypothesis is supported by research that suggests that intervention groups show an increase in nutritional knowledge as a result of an educational

intervention (Hoffmann et al., 2005; Skrinar et al., 2005; Vreeland et al., 2003; Vreeland et al., 2010).

***Hypothesis 2.*** Participants would report greater engagement in healthy behaviors. Greater participation in healthy behaviors was assessed via the Solutions for Wellness Healthy Eating and Wellness Self-Assessment and the Healthy Behavior Inventory that was utilized before, during, and after program participation.

*Rationale.* Participation in the Solutions for Wellness program would increase participants' decision-making in favor of healthy lifestyle choices. Prior research in individuals with serious mental illness, has provided evidence of wellness programs increasing healthy activities in this population (Devlin et al., 2000; Hoffmann et al., 2005; Skrinar et al., 2005; Porsdal et al. 2010; Vreeland et al., 2003).

***Hypothesis 3.*** Participants would have a decrease in BMI.

*Rationale.* Participants in the Solutions for Wellness program would be more likely to incorporate the healthy guidelines into their lifestyle. Research shows that individuals who make healthy lifestyle choices (i.e., diet and exercise) have lower BMIs than individuals who do not make healthy lifestyle choices (Devlin et al., 2000; Hoffmann et al., 2005; Skrinar et al., 2005; Vreeland et al., 2003; Vreeland et al., 2010).

***Hypothesis 4.*** Participants who were in the preparation, action, or maintenance stages of change would experience greater benefits (i.e., increased knowledge, decreased BMI, increased lifestyle changes) from the Solutions for Wellness program than participants who were in inactive stages of change.

*Rationale.* The stage of change, as determined by Prochaska and DiClemente's (1992) model, will be measured by University of Rhode Island Stages of Change (URICA) scores before, during, and after treatment. This hypothesis is supported by the research of Wee et al. (2004) indicating that individuals in the preparation and action stages of change are likely to benefit more from a weight control intervention. Also, the maintenance stage is included in this, due to the difficulty of differentiating action from maintenance stages over time (Prochaska, 1994; Wee et al., 2004).

***Hypothesis 5.*** Participants would report an improvement of quality of life indices, as measured by the SF-12 and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS).

*Rationale.* Skrinar and colleagues' (2005) study indicates that this population can benefit from a weight loss intervention to improve health and psychosocial constructs. Also, the study by Mamplekou et al. (2005) assessing psychological well-being before and after weight loss in a population of morbidly obese individuals concluded that psychosomatic symptoms and quality of life aspects (i.e., physical, social, and emotional) improved after follow-up for 2 years. In addition, specific subpopulations in this study experienced a decrease in depressive symptoms and a decrease in feelings of hostility following the weight loss (Mamplekou, Komesidou, Bissia, Papakonstantinou, & Melissas, 2005). In further support of improvement of quality of life following weight loss, Ahroni et al. (2005) found similar improvements in quality of life, particularly related to a decrease in depressive symptoms. Additionally, following weight loss, improvements were reported in symptoms of arthritis, asthma, diabetes, gastroesophageal

reflux disease, hyperlipidemia, hypertension, joint and back pain, sleep apnea, and stress incontinence, which were all considered statistically significant using the SF-36 (Ahroni, Montgomery, & Watkins, 2005).

### Chapter 3

#### Method

##### *Participants.*

Five participants receiving mental health services through Keystone Community Mental Health Services (KCMHS), a community mental health nonprofit agency, participated in the Solutions for Wellness Choosing Wellness: Healthy Eating program. KCMHS serves a diverse adult population within the Dauphin County, Pennsylvania area, primarily in the Harrisburg area. Many of the individuals served are of lower socioeconomic status and participate in case management services through KCMHS or the Dauphin County Case Management Unit. Among the services KCMHS provides are supportive living, intensive case management, community residential rehabilitation, domiciliary care, peer support, specialized community residence, and structured residential services. In addition, KCMHS manages vocational services through Gateway Employment Group, supporting people with disabilities in locating meaningful employment opportunities.

The sample in this study consisted of 1 male and 4 females; with a mean age of 45 and an age range of 28 to 54. Four individuals identified as Caucasian, and one individual self-identified as American Indian. The participants' level of education varied from some high school education to completing a trade or technical school. The majority was unemployed and on disability; however, one individual maintained part-time employment in addition to receiving disability benefits. All participants were active in more than one service provided by KCMHS. The majority rented a home. All

participants reported having more than one medical condition, in addition to a mental health diagnosis. The variety of medical conditions included the following, many of which were endorsed by more than one participant: back pain, acid reflux, high blood pressure, high cholesterol, asthma, arthritis, migraines, thyroid disease, fibromyalgia, hepatitis, kidney disease, liver disease, and sleep apnea. Diabetes was diagnosed in one participant midway through the intervention phase. The following mental health diagnoses were reported by participants: anxiety disorder, alcohol abuse, substance abuse, borderline personality disorder, bipolar disorder, major depressive disorder, post-traumatic stress disorder, and autism. The majority had multiple mental health diagnoses. Two participants had mental health and substance use disorders. Probably as a result of having multiple medical and mental health conditions, all participants reported taking medication. All participants reported taking at least one psychiatric medication. However, the majority took more than one psychiatric medication.

The sample was selected from individuals who meet the criteria for a serious mental illness, a BMI of 30 or greater, and at the time of the study were participating in a KCMHS program, with the exception of specialized community residence and structured residential services. The sample was recruited through KCMHS programs located in Harrisburg, Pennsylvania. All participants choose to participate voluntarily, upon meeting the study criteria. Participants reported the following background information, as indicated above: current psychiatric diagnosis, current medical conditions, current medications, KCMHS program enrollment, living situation, level of education, work history, weight, height, age, gender, and race/ethnicity.

***Recruitment procedure.*** Potential participants were recruited through an email letter of recruitment provided to KCMHS providers. In addition, the principal investigator met with KCMHS program staff to provide flyers, allow for discuss the study, and encourage distribution of flyers to potential participants within each program. The flyers provided information regarding the study and eligibility criteria. Seven potential participants contacted the investigator by telephone, as noted in the flyer. One potential participant did not meet eligibility criteria, as s/he did not meet the BMI criteria. Another potential participant declined to participate, upon learning the purpose of the study. Five participants were obtained through this recruitment procedure.

***Screening phase.*** For the screening, potential participants completed an eligibility and demographic sheet with the researcher, providing background information, including study criteria. The eligibility and demographic sheet is located in Appendix C. Height information was obtained via self-report, while weight was measured using a scale in a private location at the site or at the individual's residence (the same scale was used at all locations). Both the height and weight were obtained for calculation of BMI scores. The investigator completed initial assessments with each individual.

***Intervention phase.*** All participants reviewed and signed the informed consent form approved by the Treatment and Ethics Board of KCMHS and Philadelphia College of Osteopathic Medicine's Institution Review Board prior to participation in the study. The informed consent form was read by each participant in the presence of the investigator, who encouraged discussion, as needed, to address any concerns or questions. All participants reviewed and signed the informed consent form prior to

participating in the study. They had the opportunity to discuss and review the informed consent with the investigator and/or the group leader throughout the study.

Following the informed consent process, the investigator administered the baseline study instruments, The Healthy Eating and Wellness Self-Assessment, Healthy Behavior Inventory, SF-12, The Warwick-Edinburgh Mental Well-being Scale (WEMWBS), and URICA on a weekly basis for 4 weeks prior to the intervention. Measurements were obtained to calculate BMI measurements on a weekly basis before, during, and after the intervention, using the same methods as during screening. Participants were expected to participate in a 12-week Solutions for Wellness program for one hour, twice a week. The discussion topics varied each session and encompassed nutritional eating components. During the 12-week intervention, the group leader provided and collected assessments for each of the 22 topics before and after the session. In addition, the investigator continued to administer the Healthy Behavior Inventory, SF-12, WEMWBS, URICA, and Healthy Eating and Wellness Self-Assessment on a weekly basis. As in the baseline period, the Healthy Behavior Inventory, SF-12, WEMWBS, URICA, and Healthy Eating and Wellness Self-Assessment were completed on a weekly basis for 4 weeks following completion of the intervention.

The nutritional group session was held at the KCMHS agency office in a meeting room. All group sessions were led by the same master's-level mental health professional, with the exception of one session, when another master's-level mental health professional substituted. The group leaders were informed of the protocol and procedures for implementation prior to initiating use of the protocol for the intervention. The



investigator was responsible for identifying a mental health professional to lead the sessions, as well as for ensuring the mental health professional was proficient in order to maintain fidelity to the protocol. The protocol does include fidelity measures to ensure the sessions, as indicated in the workbook. The group leader was responsible for ensuring that participants completed topic assessments before and after each session, which were provided as part of the protocol. Confidentiality was preserved by using a coding system and storing assessments in a locked filing cabinet.

***Inclusion criteria.*** Each participant had to meet criteria for having a serious mental illness as described previously, a BMI of 30 or greater, must be 18 years of age or older (adult), and participate in at least one of the service programs provided through KCMHS. Individuals had to be able to either read or understand English at a sixth grade level. Participants with co-occurring diagnoses were eligible for this study; however, all participants were required to avoid being under the influence while attending intervention sessions. Individuals with co-occurring diagnoses of substance abuse and mental illness were included because “coexisting rates [range] from a low of 25% to a high of 84% depending on treatment setting” (Johnson, Brems, & Burke, 2002, p. 244). Furthermore, the study by Johnson et al. (2002) showed that individuals with co-occurring diagnoses in treatment experience poorer mental health and poorer physical health; hence, they could benefit from a wellness program to manage these areas of concern.

***Exclusion criteria.*** Individuals involved with specialized community residence and structured residential services were ineligible for this study, as individuals in these settings lack the opportunity to prepare their own meals. Also, women who were

pregnant were excluded because the nutritional protocol does not take into account dietary needs for pregnant women. Additionally, individuals who had a legal guardian were excluded. Lastly, if a participant missed more than 50% of the meetings, then his/her data were not included in the statistical analysis, as they did not complete the intervention as intended. However, those participants could continue to attend the groups.

### **Measures.**

#### ***Body mass index.***

***University of Rhode Island Stages of Change (URICA).*** The URICA is a 32-item self-report instrument that measures four stages of change: precontemplation, contemplation, action, and maintenance (Prochaska, 1994). This measure has primarily been utilized in an adult, outpatient, alcoholism treatment population. However, the URICA has been utilized to measure motivation to change in treatment, and in research regarding health and addictive behaviors. In a study by Swanson et al. (1999), the URICA was utilized to measure motivation to change and outpatient treatment adherence in individuals with serious mental illness and in individuals with dual diagnoses (Swanson, Pantaloni, & Cohen, 1999). The URICA assesses motivation to change, according to the transtheoretical model, by providing scores related to the four stages of change using four 8-item subscales in the 32-item version of the URICA. Responses are given on a 5-point Likert scale ranging from 1 (strong disagreement) to 5 (strong agreement). The four subscales are combined arithmetically to lead to a second-order continuous Readiness to Change score that can be used to assess readiness to change at

the start of treatment (DiClemente, Carbonari, Zweben, Morrie, & Lee, 2001; DiClemente & Hughes, 1990). The URICA has been found to be useful in providing five stages of profiles in an adult, outpatient alcoholism treatment population: precontemplation, ambivalent, participation, uninvolved, and contemplation. Clinicians can utilize this information to individualize and guide treatment approaches at the client's level of readiness. The scores on the URICA have also been helpful in monitoring changes in individual attitudes related to shifts in motivation to change over time (DiClemente & Hughes, 1990). With regard to validity, the predictive and construct validity of the URICA has been established for use primarily with individuals with alcohol disorders (Carbonari & DiClemente, 2000). Concurrent validity of the readiness score has been shown to be good, but this measure was found to do poorly with predicting final treatment outcomes (Blanchard, Morgenstern, Morgan, Labouvie, & Bux, 2003).

***Medical Outcomes Study Short-Form 12-Item Health Survey (SF-12).*** The SF-12 is a shortened form of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), which measures health-related quality of life (HRQOL). The SF-12 measures health status using 12 questions to determine physical health and mental health quality of life components. The physical health component summary score (PCS) and mental health component summary score (MCS) include eight separate scales (Gatchel & Oordt, 2003; Kennedy, Salsberry, Nickel, Hunt, & Chipps, 2005). These eight scales include questions on physical functioning, role limitations due to physical health problems, bodily pain, general health, vitality (energy/fatigue), social functioning, role

limitations due to emotional problems, and mental health (psychological distress and psychological well-being) (Kennedy et al., 2005). Higher scores on the PCS and MCS indicate better health quality of life. The SF-12 has been found to have a 91% and 92%, respectively, of variance in the longer form SF-36 physical and mental health summary scores (Ware, Kosinski, & Keller, 1994; Windsor, Rodgers, Butterworth, Anstey, & Jorm, 2006). Like the SF-36, the SF-12 has been empirically supported as a psychometrically sound health quality of life measure for populations with serious mental illnesses (Salyers, Bosworth, Swarnson, Lamb-Pagone, & Osher, 2000; Windsor, Rodgers, Butterworth, Anstey, & Jorm, 2006). The test-retest reliability of the SF-36 has been found to be moderate over a 1-week period, and the validity of many of the scales was sensitive to changes over time in populations with serious mental illnesses (Salyers et al., 2000). Reliability of the SF-36 summary scores has been found to be typically higher than 0.90, and the eight scales have strong correlations with the symptoms and problems being addressed (Ware et al., 1994). Preliminary research suggests that the SF-12 is a reliable and valid measure to assess health-related quality of life issues in a population of individuals with serious mental illnesses (Salyer et al., 2000).

***Topic assessment in the Solutions for Wellness Workbook 1 Choosing***

***Wellness: Healthy Eating.*** Topic assessments are included in the Solutions for Wellness Choosing Wellness: Healthy Eating protocol. The protocol encompasses 22 sessions and therefore 22 topic assessments to be used before and after each session, as recommended by the protocol. Both before and after topic assessments encompass four multiple choice questions. Each topic assessment includes three directions: read each question carefully,

read every answer before marking one, and mark only one answer to each question.

There is space for the individual's name and the date and a prompt for the individual to mark if the assessment is before or after the session. The group leader discouraged participants from filling in their name for the purpose of this study; instead, coding was utilized to manage the data obtained in the group. Both the before and after topic assessment utilized the same four multiple choice questions based on the session's topic. However, the post topic assessment included three questions answered on a 6-point Likert scale, with responses ranging from "strongly disagree" to "strongly agree" that address the participants' perceived confidence, importance, and helpfulness of the session's material. Additionally, the post session topic assessment included two open-ended qualitative questions encouraging s/he to indicate what the participant liked about the session and how the session could be better.

***Healthy Eating and Wellness Self-Assessment in the Solutions for Wellness***

***Workbook 1 Choosing Wellness: Health Eating.*** This assessment can be conducted in Workbook 1 during Session 5, pages 52-53, as a self-report measure to rate participants' current health-related behaviors. The directions inform participants to "score yourself according to how well you match the following statements," which require a response to 20 items. Responses are given on a 5-point Likert scale ranging from 1 (never) to 5 (always). To obtain the score for the *Healthy Eating and Wellness Self-Assessment*, all 20 items are added up and divided by 20, and scores can be easily interpreted by referring to the How Did You Rate? Section on page 53. A score of 4 and above means the participant is considered healthier than average and actively participating in a healthy

lifestyle. The lower the score, the more improvement a participant may need to actively engage in healthy lifestyle practices (Vreeland, Toto, & Sakowitz, 2007). For the purpose of this study, this assessment was used before, during, and after the intervention on a weekly basis.

***Healthy Behavior Inventory.*** This assessment was developed by the researcher in an effort to obtain additional information on specific healthy changes that may or may not be made on a weekly basis by each participant. The self-report measure asked each participant to reflect on choices made over the past week. The Healthy Behavior Inventory consists of 10 forced choice questions with only yes or no response options. If a participant responded yes to a given question, s/he was further asked to circle the average number consumed daily. The participant was then given range options of 1-2, 3-5, and 5 or more for the first nine questions. This range differed on the last question, as it inquires if the participant ceased or decreased alcohol consumption; therefore, the range options for this item were 0-2, 3-5, and 5 or more. See Appendix D for the Healthy Behavior Inventory.

***The Warwick-Edinburgh Mental Well-being Scale (WEMWBS).*** The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was created to address a need to measure positive mental health; a panel developed this scale based on the literature and researched and tested the scale on student and representative populations in the U.K., including Scotland (Stewart-Brown et al., 2009). The WEMWBS showed positive results for content validity and moderate correlations to other scales that measure mental health well-being. In addition, test-retest reliability at 1 week was high and social desirability

bias was lower than or similar to other tests. However, internal consistency reliability was of some concern, as testing using Cronbach's alpha suggested item redundancy (Stewart-Brown et al., 2009).

The WEMWBS is different from other mental health well-being measures because it only measures positive aspects. For example, one statement is "I've been feeling confident." The WEMWBS is a scale that includes 14 positive statements about thoughts and feelings about mental well-being. The directions state "Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the past 2 weeks." For the purpose of this study, participants were asked to respond according to their experience over the past week. Response choices are on a 5-point Likert scale ranging from 1 (none of the time) to 5 (all of the time). This scale was chosen for use in this study due to good content validity, high level of internal consistency and reliability, and consistency with other mental health well-being scales. It has been shown to discriminate between populations consistent with similar measures (Tennant et al., 2007). Overall, research on the WEMWBS has shown strong psychometric properties to support its use to measure mental well-being.

#### **Design and justification.**

The design was a multiple-case repeated measures design with multiple measures before, during, and after the intervention. This design allows for the documentation of patterns or trends in behavior. Also, the repeated measures component increases the statistical power of findings, although in this case power was negatively impacted by the small sample size. In a repeated measures design, internal validity is controlled for

because it is highly unlikely that confounding factors would coincidentally occur at both onset and completion of the intervention (Portney & Watkins, 2008). However to ongoing consideration of practice effects or learning effects is needed, as this is a possibility when utilizing the same measures before, during, and after the intervention. Also, generalizability is a concern when utilizing a small sample size and attempting to make associations to the larger population. Despite some of the limitations, this design provides treatment for all participants and allows for observed trends and changes in behavior. Also, this design allows for a greater depth of qualitative information to examine about the impact of the intervention.



## **Chapter 4**

### **Results**

The purpose of this study was to assess if the Solutions for Wellness Choosing Wellness: Healthy Eating intervention would yield an improvement in knowledge and increase in healthy lifestyle choices among a group of 5 participants (1 male, 4 females) with serious mental illnesses. Data were collected on a weekly basis for 4 weeks prior to the intervention, throughout the intervention, and for 4 weeks following completion of the intervention. In order for the data to be included in the analyses, participants had to attend a minimum of 50% of the group sessions. Four of five participants did attend a minimum of 50% of the group sessions. One female participant completed 4 weeks of baseline assessments. This participant did not attend any group sessions; therefore, her data was not included.

The first hypothesis was that participants would exhibit an increase in knowledge of healthy lifestyle guidelines, as indicated by a greater number of correct responses on the Solutions for Wellness Topic Assessments following each group session. Topic assessments were provided at the beginning of each session and the end of each session. The median pre-test score for all participants and across all attended sessions was 3.

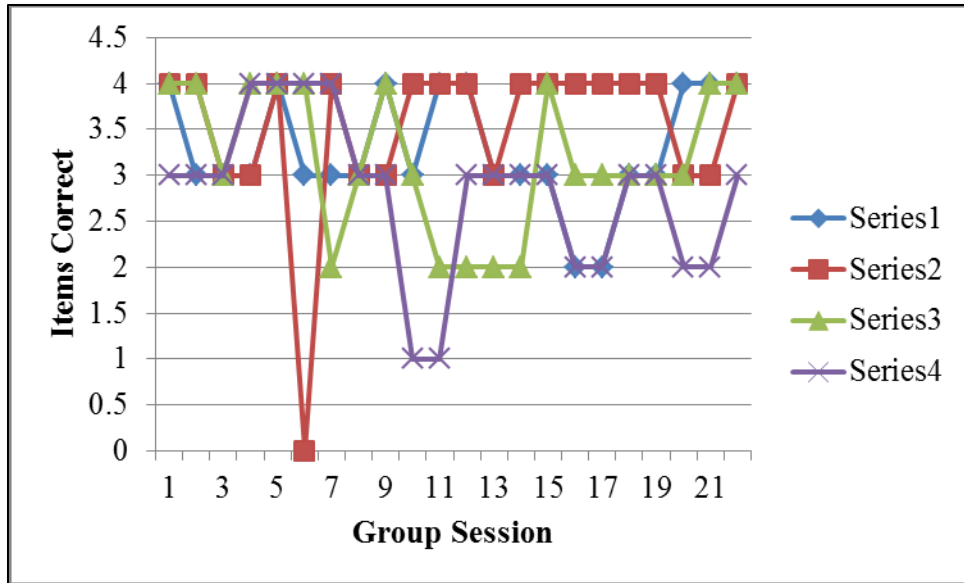


Figure 1. Topic assessment pretest scores. This figure represents participants' pretest scores across all sessions, using last observation carried forward for missing data points.

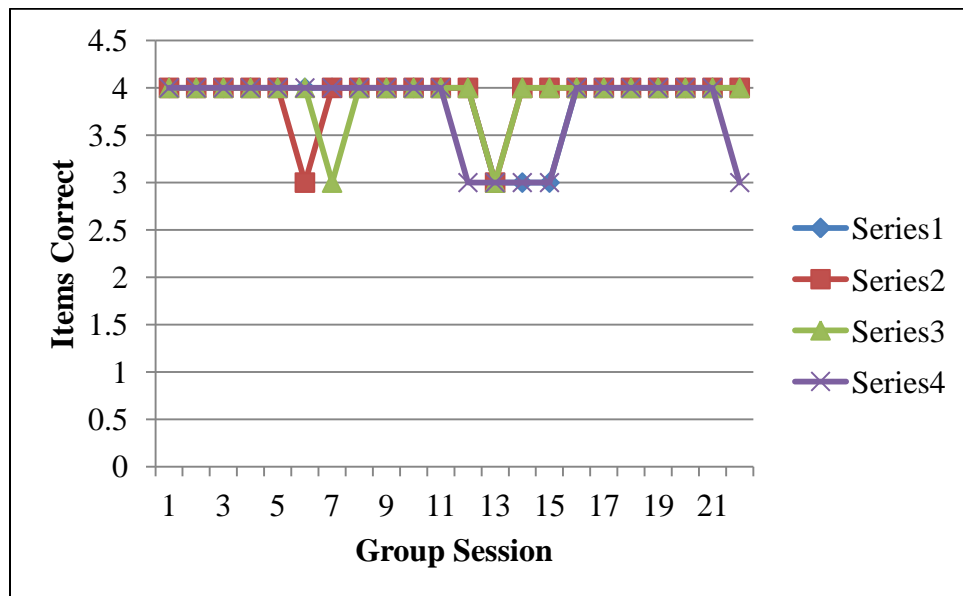


Figure 2. Topic assessment posttest scores. This figure represents participants' posttest scores across all sessions, using last observation carried forward for missing data points.

Figure 1 shows total items correct (of 4 questions) on the pretest topic assessment for each group session with each line showing variability among each. The technique of last observation carried forward was used to replace any missing values with the last available measure. The technique assumes the participant's responses would remain stable, assumes that missing values are missing at random, and is used frequently to address common problems in longitudinal research related to missing data. Figure 2 shows total items correct (of 4 questions) on the posttest topic assessment for each group session with each line showing variability among each participant with use of last observation carried forward. The median posttest score across all participants and across all sessions using last observation carried forward is 4.

Topic assessment scores appeared to improve following the intervention, given the overall higher median posttest scores and the consistent pattern of elevated posttest scores across sessions and across participants. The pretest median scores varied from 3 to 4, while the posttest median scores were 4 for all participants. To assess if the improvement in topic assessment scores following the intervention was statistically significant, the Wilcoxon signed rank test was used. This test involves subtracting the first score from the latter score, which in this case is comparing the pretest scores with the posttest scores. This analysis leads to three possible outcomes: negative differences (first is larger than the last; decline in score), positive differences (last score is larger than the first score; increase in score), or no difference (no change in score; these scores are eliminated from further consideration). The test statistic is the smaller of the positive or negative rankings, which can be converted to a  $z$  score. Using data with last observation

carried forward to compare pretest topic assessment scores with posttest topic assessment scores, 36% (8 of 22 total sessions) of posttest topic assessment scores were statistically significantly higher following the intervention ( $p = .15$ ). Given the small sample size subsequent low power and the preliminary nature of this study, an alpha value of .15 was used to increase power and indicate statistically significant change as opposed to a traditional alpha of .05. However, in order to determine whether the results were truly significant, the study needs to be replicated with a larger sample. Table 1 shows the sessions with a statistically significant change in topic assessment scores following the intervention.

Table 1 <i>Sessions with Significant Change (<math>p = .15</math>)            on Follow- Up Topic Assessment Scores</i>		
Week	z score	p value
3	-2.000	.046
8	-2.000	.046
10	-1.633	.102
16	-1.633	.102
17	-1.633	.102
18	-1.732	.083
19	-1.732	.083
20	-1.633	.102

Although improvement in topic assessment scores only appeared to be significant following the intervention in 8 of 22 sessions, participants reported increased knowledge and other benefits from the intervention through the additional posttest topic assessment questions, which were included in the Solutions for Wellness topic assessment version only. For example, participants responded to statements regarding perceived confidence in understanding and using the material presented in each group session. More than half of participants' (60%) agreed or strongly agreed with the statement of feeling confident in understanding the new material presented. Additionally, 100% of the participants' responses agreed or strongly agreed with the statement "This information is important to me." Also, the majority of participants' (84%) were agreed or strongly agreed with the statement "This session has helped me." When participants commented on "What I liked about this session," they often noted information learned within the session. One participant stated in Session 7, "Very informative on reading labels, counting calories, seeing the percentage of ingredients, how many servings." Another participant responded to the same question in Session 18 "Topics, learning, vegetables, how to shop." Overall, participants' responses to posttest topic assessment questions provided encouraging data from which we may infer some increased knowledge of healthy lifestyle choices, despite limitations in statistical significance of the posttest topic assessment scores.

The second hypothesis was that participants would report greater engagement in healthy behaviors. Greater participation in healthy behaviors assessed via the Solutions for Wellness Healthy Eating and Wellness Self-Assessment (SFW Health Eating) and the

Healthy Behavior Inventory (HBI) before, during, and after program participation. The group had a median score of 2.80 (range 2.0 to 2.9: Your healthy lifestyle and eating plan could be healthier) on the SFW Healthy Eating assessment at the preintervention period. Following the intervention, the group had a median score of 3.25 (range 3.0 to 3.9: You are average in your approach to health and healthy eating) on the SFW Healthy Eating assessment. When comparing the mean pretest score with each posttest score on the SFW Healthy Eating Assessment using the Wilcoxon Signed Rank Test, the improvement in scores from preintervention to postintervention was statistically significant across the 4 weeks of follow-up ( $p = .15$ ) (Table 2).

Table 2 <i>Comparison of Average Pretest Scores to Weekly Posttest Scores</i>		
Weeks	Z Score	$p$ value
1	-1.461	.144
2	-1.826	.068
3	-1.826	.068
4	-1.461	.144

The overall improvement in SFW Health Eating assessment infers that the intervention made a positive impact on participants' actual engagement in healthy behaviors, as the scores on the SFW Healthy Eating assessment increased following the intervention (the higher the score, the more one is engaging in healthy behaviors), and the increase in scores was statistically significant across the entire 4 weeks of follow up.

Lastly, the group median scores showed improvement in overall healthy lifestyle changes, as the group was identified as needing improvement in the preintervention period to “eating with an average approach” during the postintervention period.

In addition to the SFW Healthy Eating assessment, the Healthy Behavior Inventory (HBI) was utilized to assess participants’ healthy behaviors. In the preintervention period, the group had a median score of 3 (number correct of 10 total questions) on the HBI. In the postintervention intervention period, the group had a median score of 6.5 (number correct of 10 total questions) on the HBI. When comparing the mean pretest score on the HBI with each posttest score on the HBI using the Wilcoxon signed rank test, the improvement in scores from pre to postintervention was statistically significant across the first 3 weeks of follow-up ( $p = .15$ ). Comparing the mean pretest score on the HBI with week 1 following the intervention, all participants had a higher score after the intervention, and this was statistically significant ( $z = -1.826, p = .068$ ). Week 2 following the intervention, all participants had a higher score ( $z = -1.826, p = .068$ ). Week 3 following the intervention, all participants had a higher score ( $z = -1.826, p = .068$ ). Week 4 following the intervention, two participants had a lower score than before the intervention, which was not statistically significant. Thus although the group did not report increased healthy behaviors during week 4 of the follow-up period, they did report an increase in healthy behaviors during the first 3 weeks following the intervention. Considering the outcomes of the SFW Healthy Eating assessment and the HBI, the participants’ appear to have benefited from the intervention by increased participation in healthy behaviors.

The third hypothesis stated that participants would have a decrease in body mass index (BMI). The median BMI among all participants prior to the intervention was 39.32, which is classified as severe obesity. The BMI ranged 37.27 (classified as severe obesity) to 52.08 (classified as morbid obesity). The median BMI among all participants postintervention was 40.11, which is classified as morbid obesity. The BMI among all participants postintervention ranged 35.21 (classified as severe obesity) to 48.58 (classified as morbid obesity). See Figure 3 and Figure 4 for graphs on body mass index for each participant across 4 weeks prior to the intervention and across 4 weeks following the intervention.

Table 3		
<i>Participant Preintervention and Postintervention Body Mass Index Median With Obesity Classification</i>		
Participants	Pre-intervention BMI median	Post-intervention BMI median
1	39.14 (severe)	41.0 (morbid)
2	37.5 (severe)	35.52 (severe)
3	51.33 (morbid)	47.84 (morbid)
4	39.57 (severe)	38.89 (severe)

Unlike the group median, 3 of 4 participants had a slight decrease in median BMI postintervention, (Table 3). The largest difference between preintervention and postintervention was a decrease of 3.49 in median BMI for participant 3. However, participant 1 had a slight increase (1.86) in median BMI, which resulted in increased severity of obesity classification (from severe to morbid). Despite one participant's



increase in BMI, the majority of participants had a decline in BMI postintervention, although not enough to alter the obesity classification. The differences between the mean BMI prior to the intervention and following the intervention did not yield statistically significant results during the entire 4 weeks postintervention.

The fourth hypothesis stated that participants who were in the preparation, action, or maintenance stages of change would experience greater benefits (i.e., increased knowledge, decreased BMI, increased lifestyle changes) from the Solutions for Wellness program than participants who were in inactive stages of change. The University of Rhode Island Stages of Change (URICA) was utilized to assess the stages of change for each participant prior to, during, and following the program. The URICA results indicated that only participant 3 reached the preparation/action stage of change during this study. Participant 3 was at the preparation/action stage of change during 3 sessions in the intervention phase. Although this subject was minimally at the preparation/action stage of change throughout this study, s/he did achieve the greatest decrease in BMI. However, as previously reported, the decrease in BMI across all participants did not yield statistically significant results. Participant 1 was determined by the URICA to be at the contemplation stage of change for 100% of assessment scores obtained prior to, during, and following the intervention. Participant 2 was at the precontemplation stage of change during week 1 of the preintervention period. Following week 1 of the preintervention, participant 2 was at the contemplation stage of change according to the remainder of all assessment scores obtained prior to, during, and following the intervention. Lastly, participant 4 was at the precontemplation stage of change for 89% of assessment scores

obtained prior to, during, and following the intervention; only during preintervention weeks 1 and 4 this subject was in the contemplation stage of change. Despite the fact that the majority of participants were in inactive stages of change, all participants showed improvements in reported participation in healthy behaviors, as well as some minor improvements in knowledge of healthy lifestyle choices. Overall, the stage of change did not appear to have a positive impact on participants' level of change related to healthy knowledge, healthy behaviors, and BMI.

The final hypothesis stated that participants would report an improvement in quality of life indices, as measured by the SF-12 and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). The SF-12 measures PCS and MCS, physical wellness and mental wellness, respectively. A score of 50 is considered average for the general population for each component. In regard to the WEMWBS, scores can range from 14 to 70, with a higher score reflecting a higher level of well-being.

Starting with the SF-12 measure, results of the PCS component will be discussed, followed by the MCS component. In the preintervention period, the group had a median score of 42.8 on the SF-12 PCS component, which is nearly 1 standard deviation ( $40 = 1$  standard deviation) below the average score for the general population. During the postintervention period, the group had a median score of 44.45 on the SF-12 PCS component. When comparing the mean pretest PCS score with the posttest score using the Wilcoxon signed rank test, the improvement in scores postintervention was statistically significant only in week 4 of the follow-up phase ( $p = .15$ ). Comparing the mean pretest PCS scores with postintervention scores, week 1 and week 2 each had two

participants with a higher score after the intervention, which was not statistically significant. Postintervention week 3 had one participant with a higher score after the intervention, which was not statistically significant. In week 4 of the postintervention period, one participant had a higher score prior to the intervention than after the intervention. Week 4 results are statistically significant ( $z = -1.461, p = .144$ ). The PCS component only showed statistically significant improvement in scores during week 4 of the follow-up phase.

Unlike the PCS component, the MCS component scores were higher over a longer duration during the follow-up phase. Preintervention, the group had a median score of 33.9 on the SF-12 MCS component, which is well below the average score for mental well-being. Postintervention, the group had a median score of 38.95, which is still about 1 standard deviation below average scores on this component. When comparing the mean pretest scores with the posttest scores using the Wilcoxon signed rank test, the improvement in scores was statistically significant in weeks 1, 3, and 4 of the postintervention period ( $p = .15$ ). In week 1 following the intervention, one participant had a higher score prior to the intervention than after the intervention. Three participants had a higher score after the intervention. Week 1 results were statistically significant ( $z = -1.461, p = .144$ ). In week 2 following the intervention, one participant had a higher score prior to the intervention than after the intervention, and three participants had a higher score after the intervention. Week 2 results were not statistically significant. In week 3 postintervention, all participants had a higher score after the intervention. Week 3 results were statistically significant ( $z = -1.826, p = .068$ ). In week 4 following the

intervention, all participants had a higher score after the intervention. Week 4 results were statistically significant ( $z = -1.826, p = .068$ ). Overall, the MCS, or mental well-being, of participants appeared to improve over the majority of the follow-up phase. Although the increase in MCS scores indicated improvement in mental well-being, the median posttest MCS scores continued to show below average status in mental well-being.

In addition to measuring participants' physical and mental well-being using the SF-12, the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was utilized to assess positive emotional well-being among participants. Preintervention, the group had a median score of 35.5 on the WEMWBS. Postintervention, the group had a median score of 37.5 on the WEMWBS. When comparing the mean pretest score on the WEMWBS with posttest scores using the Wilcoxon signed rank test, the improvement in scores following the intervention was statistically significant only in week 2 of the postintervention period ( $p = .15$ ). Comparing the mean pretest scores on the WEMWBS with week 1 following the intervention, three participants had a higher score after the intervention; however, the results were not statistically significant. In week 2 following the intervention, three participants had a higher score after the intervention, and 1 participant had no change in score. Week 2 results were statistically significant ( $z = -1.604, p = .109$ ). In week 3 following the intervention, three participants had a higher score after the intervention, which were not statistically significant. In week 4 following the intervention, two participants had a higher score prior to the intervention, and two participants had a higher score after the intervention, which were not statistically

significant. Overall, the WEMWBS showed slight improvement in positive well-being following the intervention, as indicated by the higher group postintervention median score and the significant change that occurred during the postintervention period at week 2. Overall, the quality of life measures of physical and mental well-being showed some improvement following the intervention, however, the improvement in well-being appeared to be most apparent in the mental well-being component of the SF-12, showing statistically significant improvements during 3 of the 4 weeks in the postintervention period. The improvement on the mental well-being scores continued to indicate below average mental well-being.

## Chapter 5

### Discussion

The purpose of this study was to assess if the Solutions for Wellness Choosing Wellness: Healthy Eating Intervention would result in improvement in knowledge and increased engagement in healthy lifestyle choices among a small group of participants with serious mental illnesses. The improvement in knowledge was measured by topic assessments provided prior to and following each group session. Statistically significant improvement occurred in scores following 8 of 22 sessions. The increase in healthy lifestyle knowledge, measured through topic assessment scores before and after each session, did not indicate a consistent pattern of increased knowledge. Notably, five of eight sessions that showed statistically significant results were in the latter half of the intervention. Participants' continued increase in knowledge may reflect their continued interest in sessions, despite the inconsistent pattern of posttest scores. Furthermore, qualitative information provided through the additional posttest topic assessment questions showed that the participants believed that the information presented was important and was helpful, 100% and 84% of the time, respectively.

In regard to incorporating healthy choices into their lifestyles, results on the Solutions for Wellness Healthy Eating and Wellness Self-Assessment (SFW Health Eating) showed very promising results. SFW Healthy Eating showed that the group was eating within an average range following the intervention, in comparison to needing improvement on nutritional habits prior to the intervention. Also, the SFW Healthy Eating showed statistically significant changes in increased healthy behaviors throughout

the 4-week follow-up phase. For example, participant 1 responded “always” to the statement “I keep track of my personal health measures such as weight and blood pressure” throughout the entire 4-week follow-up phase. Similarly, participant 3 responded “always” to statements of “I choose drinks low in sugar” and “I get regular check-ups” throughout the entire 4-week follow-up phase. This subject’s reported healthy changes during the follow-up phase were timely and of great importance, as participant 3 learned s/he had with diabetes while participating in the intervention. Still, some participants chose to make overall changes, without necessarily focusing on one area. For instance, participant 2 had an overall change in responses with an increased frequency of reporting “sometimes” to the majority of statements during the follow-up phase in comparison to previous responses of “rarely” to the majority of statements. Overall, the SFW Healthy Eating assessment showed significant results indicating healthy behavior changes to 4 weeks after the completion of the intervention.

Similar to the evidence reported in the SFW Healthy Eating assessment, participants reported increased healthy behaviors following the intervention on the Healthy Behavior Inventory. The results of data from the Healthy Behavior Inventory showed statistically significant changes for 3 of 4 weeks. A variety of healthy behavior changes were reported by all participants. For example, participant 1 reported multiple healthy behavior changes, although not necessarily the same behavior change throughout the follow-up phase. Still, participant 1 reported decreasing portion sizes, increasing eating breakfast, and increasing physical activity consistently throughout the follow-up phase. Again, similar to the SFW Healthy Eating assessment, Participant 3

consistently noted decreased intake of sugary drinks. In addition to this change, participant 3 consistently reported changes in others areas, such as decreased intake of fast food and increased physical activity. The results of the Healthy Behavior Inventory analysis indicate reporting of the same behavior changes (i.e., decrease in sugar drinks) as in the SFW Healthy Eating assessment. Additionally, the Healthy Behavior Inventory identified additional healthy behavior changes that may not have been addressed in the intervention, such as physical activity. The intervention did not include a physical activity component; however, several participants reported an increase in physical activity during the follow-up phase. The changes in behaviors not addressed in the intervention may indicate interest in health beyond the intervention, as well as generalization of healthy behaviors beyond the scope of information presented in the intervention.

The results of the SFW Healthy Eating and Healthy Behavior Inventory are promising in that the Solutions for Wellness intervention did lead to increased healthy behaviors by participants. Again, these results are encouraging because they suggest that nutritional education interventions can increase healthy behaviors among individuals with serious mental illnesses. The benefits from the Solutions for Wellness intervention seemed to benefit at least two participants (participants 2 and 3), as these participants attended the sessions consistently and reported a consistent improvement in healthy behavior changes. One female participant (participant 3) had an observed change in healthy behaviors, as she learned she had diabetes during the intervention and appeared to become more invested in making behavioral changes. This individual also attended the



most sessions (21 of 22 sessions). In addition, another female participant (participant 2), who reported rarely participating in activities outside of the home, appeared to have significant benefits from the intervention (increased healthy behaviors and the largest decline in BMI) and tended to generalize her healthy lifestyle changes (i.e., increase in physical activity). Participant 2 had consistently expressed to the investigator, to the group leader, and in comments made on her posttest topic assessments her motivation to attend this group and her willingness to make changes. Both of these participants reported interest in continuing the group. Participant 2 stated “I hope for a group to do part two: physical activity” and participant 3 stated “It is a bittersweet last day for it. Hope and plan to continue good eating habits” on the final posttest topic assessment. Therefore, the results for at least two participants suggest that some individuals with serious mental illnesses do make healthy changes with a nutritional education intervention that can impact their lives, such as keeping medical appointments for comorbid conditions, and to manage other medical conditions as they arise.

Although, the remaining two participants had expressed benefiting from the intervention, it appeared to be on a more limited basis. The male participant (participant 4) only attended slightly over 50% of the sessions because of his part-time employment schedule. This individual may have benefited more from the intervention, if he had been able to participate in sessions on a more consistent basis. In addition, another female participant (participant 1) appeared to benefit minimally, as she had an increase in BMI and made limited healthy behavior changes. It is unknown what barriers this participant experienced that may have prevented her from benefiting more from this intervention, as

she chose not to respond to qualitative questions available in the posttest topic assessments. The group leader did comment that participant 1 often declined to make small healthy changes while in group, especially when holiday events or social gatherings occurred. The possible lack of consistency in her healthy behavior changes may have been a barrier for participant 1, although she did report participating in other activities to manage or improve her health (i.e., checking blood pressure, keeping medical appointments). Although these two participants appeared to benefit less than other participants, the overall results showed that individuals with serious mental illnesses can overcome potential barriers in mental health care (i.e., side effects of medications, medical model of treatment) and comorbid health-related issues (i.e., obesity) by making healthy choices, seeking medical care, and following through with nutritional recommendations and guidelines to manage overall wellness.

As noted above, the benefits from the intervention and the healthy behavior changes that took place among participants appeared to vary. However, the URICA scores did not indicate variations in stages of change among all the participants. In fact, the majority of the time, the URICA scores identified all the participants as in inactive stages of change prior to, during, and following the intervention. Only one participant's URICA scores indicated being in the preparation/action stage of change at three time points during the intervention. The overall outcomes of the URICA seem contradictory when considering the various differences in healthy behavior changes that occurred in the group. It appeared that at least two participants were in active stages of change, as indicated by their attendance and their healthy behavior changes; however, the URICA

did not indicate that these participants were in active stages of change. There are a few possible reasons for the apparent ineffectiveness of the URICA in showing variation in stages of change. It may be that this measure was not effective in this population of individuals with serious mental illnesses. Another possibility is that the participants minimized their motivation and behavior changes when completing this measure. Regardless, the URICA did not appear to be an accurate measure of stages of change in this study.

Similar to the limited advancements in stages of change shown on the URICA, results on outcome measures related to body mass index and quality of life did not show substantial changes towards improvement following the intervention. Despite reported behavior changes, the participants did not show statistically significant decreases in BMI following the intervention. There are possible reasons the BMI did not change with healthy behavior changes. First, it is possible that the healthy behavior changes were not consistent or were not significant enough to cause statistically significant changes in the BMI. Also, participants may have overestimated or underestimated their behavior changes, as the healthy behavior assessments were all self-report. Second, this intervention did not include a physical activity component, which could have limited weight loss because the focus was primarily on nutritional changes. Often, the combination of physical activity, nutritional, and other lifestyle changes is recommended for weight loss (Devlin et al., 2000). Still, the limited weight loss due to a lack of a physical activity component may or may not be relevant, as the Healthy Behavior Inventory suggested at least some participants reported increased physical activity,

despite this not being addressed specifically during the intervention. Finally, it seems relevant to consider the role of medications in weight gain or weight loss, as individuals with serious mental illnesses often utilize psychiatric medications known to have significant side effects, including weight gain. The participants in this study reported taking multiple psychiatric medications. In general, individuals with serious mental illnesses tend to take psychiatric medications on a long-term basis, and it is known that antipsychotic medications, including newer antipsychotic medications, have significant side effects often related to weight gain and/or comorbid medical conditions, such as metabolic syndrome (Allison et al., 2006; Brown, 2006; Connolly & Kelly, 2005). Given these potential barriers and the finding of significant behavior changes without a decrease in BMI, it may be inferred that individuals with serious mental illnesses may have a more difficult time losing weight, even when taking the steps to make healthy lifestyle changes.

In addition to lack of significant changes in BMI, the quality of life measures showed minimal improvement in physical well-being and inconsistent improvement in mental well-being. Measures related to mental well-being showed some statistically significant changes; however, even with improvement in mental well-being following the intervention, the participants still reported lower mental well-being than average scores in the normal population. The lower than average mental well-being scores were not unexpected, as all participants had serious mental illnesses. However, the finding of some improvement in mental well-being is noteworthy in this population, as this may suggest healthy behavior changes and mental well-being are interrelated. The

interrelation of mental well-being and healthy behavior changes could indicate that mental health improvement can result from behavioral changes, as the results of this study showed statistically significant behavioral changes following the intervention with some improvement in mental well-being. However, the minimal changes in mental well-being, despite healthy behavior changes, may indicate that it is more difficult for individuals with serious mental illnesses to make healthy behavior changes and benefit physically and emotionally from the healthy behavior changes. This interconnection lends itself to future research on how mental well-being can negatively or positively impact behavioral change and vice versa, particularly among individuals with serious mental illnesses. The evidence of a relationship between physical health and mental health in this study provides further support for the mind-body connection and the current wellness movement for individuals with serious mental illnesses. It is widely accepted that the mind and body have a connection that can positively or negatively impact each other. Furthermore, the wellness model for individuals with serious mental illnesses has an emphasis on holistic care, meaning treating physical health can positively impact mental health and vice versa; therefore, it is beneficial for clinicians, professionals, and consumers to seek overall wellness through a variety of healthy lifestyle changes to achieve recovery.

**Limitations.** Several limitations should be considered regarding the design and statistical analysis of this study. The design of this study is a multiple-case repeated measures design with multiple measures before, during, and after the intervention. Considering the design of this study, there needs to be consideration of practice effects or

learning effects, as this is a possibility when utilizing the same measures before, during, after the intervention. In addition, this study utilized a small sample size; thus, generalizability is a concern when attempting to apply the results to other populations.

In regard to statistical analysis, the sample size leads to low power for statistical analysis; however, the power is somewhat mitigated by the longitudinal nature of the design of this study. The sample size creates limitations, which led to the decision to use a higher  $p$  value, which in turn leads to greater risk of Type I error. However, given that only four participants were involved in this study, a  $p$  value of .15 or smaller can still be considered quite a good result. In addition, the longitudinal nature of this design led to issues of missing data, which only occurred during the intervention phase. Missing data occurred due to participants' lack of attendance and incomplete topic assessments (i.e., participants left the session prior to completing the posttest or submitted incomplete topic assessments). The topic assessment was the only measurement utilized that had missing data due to both a lack of attendance and errors. Other measurements utilized during the intervention phase were missing data, if the participant did not attend the entire week of group sessions (hence, the assessments could not be completed). Measures, with the exception of topic assessments, did not have errors due to observation and review by the investigator, as the participants completed these measures individually with the investigator. Errors did not occur when participants completed topic assessments, because the investigator was not present. In order to manage missing data from the topic assessment, the technique of last observation carried forward was utilized to replace missing values with the last available measure, assumes the responses would remain

stable, and assumes that missing values are missing at random. This technique is used to address common problems related to missing data in longitudinal research. Use of this technique can be of some concern in regards to misrepresentation of data or creating bias in outcomes. Again, for the purpose of this study, this technique was only utilized to manage missing data for topic assessments during the intervention phase.

**Conclusion.**

This study suggests that use of the Solutions for Wellness Choosing Wellness: Healthy Eating intervention may increase healthy behaviors among a population of obese individuals with serious mental illnesses. The change in BMI following this intervention was not statistically significant. In addition, the inconsistent but positive outcomes in participants' mental well-being is promising for future research related to how health status, including obesity, can impact mental health status and vice versa. The positive changes that were observed in this small sample warrant future research with randomized controlled trials in an attempt to replicate the above findings. Lastly, the findings in this study may be limited by design and sample size, but the results show the potential for obese individuals with serious mental illness to be active in learning about and making healthy lifestyle changes to improve their health and mental well-being.

**Future Directions.**

Given the results and methods of this study, further research to identify or validate beneficial interventions to manage mental health and physical health concerns in a population of obese individuals with serious mental illnesses is warranted. This study was preliminary in nature and utilized a small sample size. In order to validate and

generalize the statistically significant findings in this study, a larger sample size with a randomized controlled design should be conducted. Additional studies on the Solutions for Wellness intervention, including the physical activity component, would be helpful in determining the full potential benefits of the Solutions for Wellness intervention.

Furthermore, this study was completed over a relatively short period; therefore, additional research over a longer duration would be helpful in determining if the changes observed in this study could be sustained over a longer period than simply a 4-week follow-up. Lastly, this study examined physical and mental well-being primarily through self-report and BMI. It would be useful for future research to consider a variety of assessment tools to measure physical and emotional changes (i.e., blood pressure readings, blood sugar readings, observational measures, etc.).

Given the process of completing this intervention and the outcomes of this study, there are a few recommendations that may be helpful in utilizing this intervention in program settings and for program directions. The recruitment of participants for this study had several barriers, despite the various methods of attempting to distribute flyers to potential participants. The recruitment process was challenging and due to a lack of interested participants, the intervention had to be postponed in an effort to acquire an adequate group size. There were several probable issues with recruitment. First, it is unknown if the flyers were distributed to all potential participants receiving services, as this was not done by study personnel. Second, participants had to contact the investigator to initiate the process in a timely manner. Third, some feedback from agency employees and participants indicated that the long-term commitment to the study was a concern, as



was the frequency of group sessions. In addition, there were some concerns expressed by employees about transportation to the sessions, although the location was chosen to provide easy access to the group either by public or private transportation. Lastly, there may have been some concerns about the research aspect among participants seeking to initiate this intervention, as this study included the additional commitments of completing assessments, and meeting with the investigator, and there were no incentives offered for participating in the research.

Based on the feedback and in regard to improving recruitment and attendance in the future, it is recommended that group sessions be held less frequently and with a flexible time commitment (i.e., variety of times of day and the option of short-term or long-term commitment). Also, it may be helpful to conduct a survey among program participants to assess the desire and interest level of potential and to obtain feedback on preferences that may decrease barriers to attending the group. Also, it may be beneficial to utilize motivational interviewing to increase the potential for participants to commit to the group, as well as to improve chances for the participants to be in an active stage of change to potentially receive greater benefits from the intervention. Lastly, as a result of this study and the barriers noted above, Keystone Community Mental Health Services personal decided to continue to conduct sessions on the Solutions for Wellness healthy eating and physical activity components on a weekly basis at the same location. In addition, Keystone is currently in the process of starting a monthly support group for individuals who completed the Solutions for Wellness groups, in an effort to continue to

provide support for the participants and encourage them to make and maintain healthy lifestyle changes on a long-term basis.

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**Appendix A**

Session 1: Choosing Healthy Eating and Wellness	Session 12: Weight Management Part II: What Do the Guidelines Say?
Session 2: A Small Changes Approach to Healthier Eating	Session 13: Managing Stress Wisely
Session 3: Food and Our Environment	Session 14: Portions and Servings: Know How Much You're Eating
Session 4: Benefits and Barriers of Healthy Eating	Session 15: Strategies to Improve Eating Habits
Session 5: Healthy Eating and Wellness Self-Assessment	Session 16: Carbohydrates: What Do the Guidelines Say?
Session 6: What Kind of Hungry Are You?	Session 17: Alcoholic and Non-alcoholic Drinks: What Do the Guidelines Say?
Session 7: Get the Facts: Nutrition Knowledge Is Power	Session 18: Tips for Eating Wisely on a Limited Budget
Session 8: Dietary Guidelines for Americans	Session 19: Food Safety: What Do the Guidelines Say?
Session 9: Adequate Nutrients within Calorie Needs: What Do the Guidelines Say?	Session 20: Fats: What Do the Guidelines Say?
Session 10: Food Groups to Encourage: What Do the Guidelines Say?	Session 21: Salt (Sodium) and Potassium: What Do the Guidelines Say?
Session 11: Weight Management Part I: What Do the Guidelines Say?	Session 22: Staying on the Road to a Healthier You



**Appendix B****Letter of Recruitment**

Dear Keystone Program Participant:

My name is Jamie Via and I am a doctoral student in Clinical Psychology at the Philadelphia College of Osteopathic Medicine (PCOM). For my degree I need to complete a research project that I am hoping to do at Keystone. I am interested in the topic of obesity which is a national health care problem and what can be done about it. I am looking for volunteers to help with my research study.

**What is my project?**

- I am offering a group to individuals participating in Keystone services that deal with healthy eating and wellness for individuals who are overweight.
- The group will last for approximately 3 months and will meet 2x a week for 1 hour each session.
- The research part would require you to fill out some questionnaires at different times of the study.

**Who can participate?**

- You need to be 18 year or older.
- You need to be an individual participating in Keystone services, but cannot reside in specialized care residential services.
- You need to be diagnosed with a mood disorder, anxiety disorder, psychotic disorder, or other mental health diagnosis that may be deemed a serious mental illness.
- You need to be overweight and for this we would ask you to get weighed to see if you are eligible for the study.

**How do I get in touch with Ms. Via to see if I am interested in possibly participating?**

- If you would like to take part in this study, please contact Jamie Via at (717) 574-3026 to set up an initial interview.
- Thank you for your interest in this project.

Respectfully,

Jamie Via, M.A., M.S. (Responsible Investigator)

**Appendix C****Eligibility and Demographic Sheet**

<p style="text-align: center;"><b>Your Physical Health</b></p> <p>Height: _____ ' _____ "</p> <p>Weight: _____ BMI: _____</p> <p>Age: _____</p> <p>Gender: _____ Male _____ Female</p>	<p style="text-align: center;"><b>How would you describe your race?</b></p> <p>_____ American Indian or Alaskan Native</p> <p>_____ African American</p> <p>_____ Caucasian</p> <p>_____ Asian or Pacific Islander</p> <p>_____ Hispanic or Latino</p> <p>_____ Other or multiracial</p>								
<p style="text-align: center;"><b>Highest level of school you have completed:</b></p> <table style="width: 100%;"> <tr> <td>_____ Grade School or Less</td> <td>_____ College Graduate</td> </tr> <tr> <td>_____ Some High School</td> <td>_____ Graduate School</td> </tr> <tr> <td>_____ High School Graduate/GED</td> <td>_____ Post Graduate School</td> </tr> <tr> <td>_____ Some College</td> <td>_____ Trade or Technical School</td> </tr> </table>		_____ Grade School or Less	_____ College Graduate	_____ Some High School	_____ Graduate School	_____ High School Graduate/GED	_____ Post Graduate School	_____ Some College	_____ Trade or Technical School
_____ Grade School or Less	_____ College Graduate								
_____ Some High School	_____ Graduate School								
_____ High School Graduate/GED	_____ Post Graduate School								
_____ Some College	_____ Trade or Technical School								
<p style="text-align: center;"><b>Work History</b></p> <table style="width: 100%;"> <tr> <td>_____ Unemployed</td> <td>_____ Student</td> </tr> <tr> <td>_____ Employed</td> <td>_____ Retired</td> </tr> <tr> <td>    _____ Full-time</td> <td>_____ Disability</td> </tr> <tr> <td>    _____ Part-time</td> <td></td> </tr> </table> <p>Type of employment: _____</p>		_____ Unemployed	_____ Student	_____ Employed	_____ Retired	_____ Full-time	_____ Disability	_____ Part-time	
_____ Unemployed	_____ Student								
_____ Employed	_____ Retired								
_____ Full-time	_____ Disability								
_____ Part-time									

**Medical History**

**Have you been diagnosed with any of these conditions? If so, please indicate the medical condition by checking below or adding in under “other.”**

____ AIDS/HIV	____ Heart Attack	____ Migraine
____ Alzheimer's	____ Heart Disease	____ Obesity
____ Arthritis	____ Heart Failure	____ Osteoporosis
____ Asthma	____ Hepatitis	____ Parkinson's Disease
____ Back Pain	____ High Blood Pressure	____ Past Stroke
____ Cancer (any type)	____ High Cholesterol	____ Seizures
____ Diabetes	____ Kidney Disease	____ Thyroid Disease
____ Emphysema	____ Liver Disease	____ Physical Disability

Other medical condition(s), including a **special diet**:

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### Mental Health

**Have you been diagnosed with any of these conditions? If so, please indicate the medical condition by checking below or adding in under "other."**

- ☐ Anxiety
                         
 ☐ Depression  
☐ Alcohol Abuse
                         
 ☐ Substance Abuse  
☐ Personality disorder (please specify: \_\_\_\_\_)  
☐ Schizophrenia or other psychotic disorder  
☐ Cognitive or learning disability  
☐ Other (please specify: \_\_\_\_\_)

Are you currently taking medication for any of the conditions marked above? \_\_\_\_\_

Please list these medications: \_\_\_\_\_

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Please indicate the **Keystone (KCMHS) service** that you are currently using?

- ☐ Keystone Intensive Case Management
                         
 ☐ SCR services  
☐ Supportive Living Services
                         
 ☐ Employment services  
☐ CRR services
                         
 ☐ Peer Support  
☐ : Other (please specify: \_\_\_\_\_)

Please indicate your **current** living situation?

\_\_\_\_\_ Keystone residence

\_\_\_\_\_ Renter

\_\_\_\_\_ Temporary Shelter

\_\_\_\_\_ Home Owner

Do you currently have a legal guardian? \_\_\_\_\_ yes \_\_\_\_\_ no

For only female applicants:

Are you currently pregnant or plan to be pregnant in the next 3-6 months?

\_\_\_\_\_ yes

\_\_\_\_\_ no

**Appendix D****Healthy Behavior Inventory**

Please read each question carefully. Answer the following questions according to actions that you have participated in over the past week. Circle the choice the best reflects your actions over the past week.

***In the past week have you:***

1. Increased your fruit and vegetable intake? **Yes or No**

If **yes**, please circle the average number of fruits and vegetables that you consumed daily.

1-2                      3-5                      5 or more

2. Decreased your intake of sugary drinks? **Yes or No**

If **yes**, please circle the average number of sugary drinks that you consumed daily.

1-2                      3-5                      5 or more

3. Substituted water or diet soda for regular soda? **Yes or No**

If **yes**, please circle the average number of water or diet soda servings that you consumed daily.

1-2                      3-5                      5 or more

4. Decreased your intake of fast food? **Yes or No**

If **yes**, please circle the average number times that you ate fast food over the *past week*.

1-2                      3-5                      5 or more

5. Decreased your intake of foods high in fat? **Yes or No**

If **yes**, please circle the average number of foods high in fat that you consumed daily.

1-2                      3-5                      5 or more

6. Increased your intake of foods high in fiber? **Yes or No**

If **yes**, please circle the average number of foods high in fiber that you consumed daily.

1-2                      3-5                      5 or more

7. Decreased portion size (eat smaller servings)? **Yes or No**

If **yes**, please circle the average number of daily meals that you consumed smaller portions.

1-2                      3-5                      5 or more

8. Maintained or increased eating breakfast? **Yes or No**

If **yes**, please circle the average number of times that you consumed breakfast over the *past week*.

1-2                      3-5                      5 or more

9. Increased physical activity (ex.30 minutes of walking)? **Yes or No**

If **yes**, please circle the average number of physical activities that you participated in over the *past week*.

1-2                      3-5                      5 or more

10. Ceased or decreased consumption of alcoholic beverages? **Yes or No**

If **yes**, please circle the average number of alcoholic beverages that you consumed daily.

0-2                      3-5                      5 or more

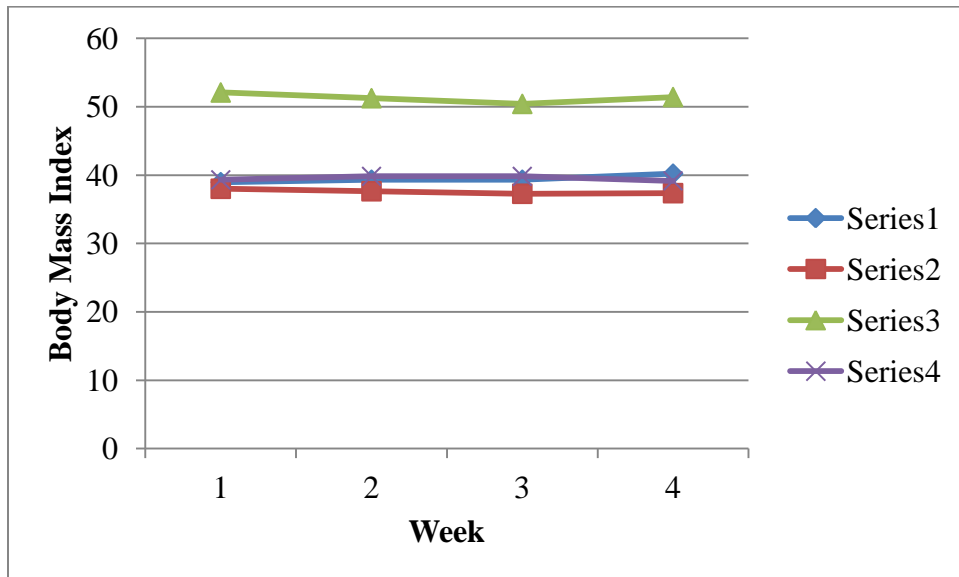


Figure 3. Body mass index for each participant across 4 weeks prior to the intervention.

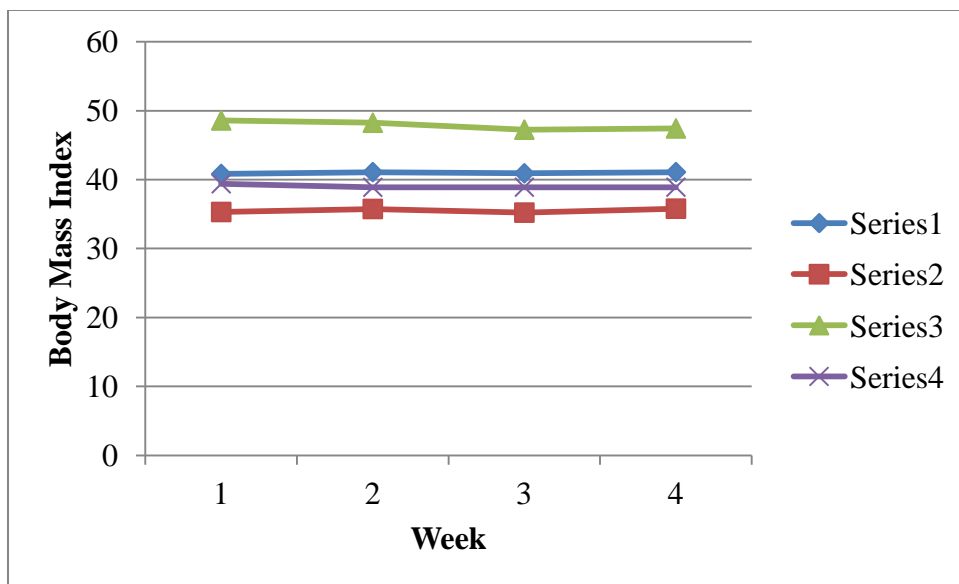


Figure 4. Body mass index for each participant across 4 weeks following the intervention.



